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ANNUAL REPORT

ON THE

MEDICAL DEPARTMENT

FOR THE YEAR

1925

BY

THE PRINCIPAL MEDICAL OFFICER,
FEDERATED MALAY STATES.

[Dowden (R.)]

KUALA LUMPUR:

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1926.

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FEDERATED MALAY STATES.

ANNUAL REPORT OF THE MEDICAL DEPARTMENT FOR THE YEAR ENDING 31st DECEMBER, 1925.

I.—ADMINISTRATION.

STAFF.

The total staff of the Medical Department, Federated Malay States, including all branches on the 31st December, 1925, was 1,038. It was divided as follows :

Hospital Branch	...	...	...	...	...	...	...	842
Health Branch	...	...	...	...	...	...	...	87
Institute for Medical Research	...	...	...	...	...	...	...	31
Central Mental Hospital	...	...	...	...	...	...	...	39
Veterinary Branch	...	...	...	...	...	...	...	32
Venereal Disease Branch	...	...	...	...	...	...	...	4
Radiologist's Branch	...	...	...	...	...	...	...	3
Total								1,038

2. The following were the principal changes which took place :

Dr. A. T. Stanton, Director of Government Laboratories, proceeded on leave on 14th March, 1925, and Dr. W. Fletcher acted for him until 14th September, 1925, and when he went to Japan as a Delegate to the Far Eastern Association of Tropical Medicine, Dr. Kingsbury acted for him as Director of Government Laboratories, until the return from leave of Dr. Stanton on 6th November, 1925.

Dr. W. F. Samuels went on leave on 15th April, 1925, and Dr. F. Wilson, Assistant Medical Superintendent, acted as Medical Superintendent, Central Mental Hospital, until the return from leave of Dr. Samuels on 4th December, 1925.

Dr. A. K. Cosgrave acted as Senior Health Officer, Federated Malay States, vice Dr. Wellington who went to Japan as a Delegate to the Far Eastern Association of Tropical Medicine from 14th September, 1925, to 9th January, 1926.

Dr. W. F. MacDonald acted as Senior Medical Officer, Selangor, from 14th September, 1925, until 9th January, 1926.

Dr. I. P. Masters, Senior Medical Officer, Pahang, proceeded on long leave to England on 15th December, 1925, and Dr. W. H. Hart acted for him until the end of the year.

Dr. (Mrs.) C. V. Burne was temporarily employed as Lady Medical Officer, Infant Welfare, during the absence on leave of Dr. (Mrs.) Were from 10th February, 1925, until 11th August, 1925.

During the year the following officers were appointed :

Dr. (Miss) C. B. Kibble as Lady Medical Officer on 28th February, 1925.

Dr. J. W. Field as Medical Officer on 31st July, 1925.

Dr. C. S. Wilson as Medical Officer on 25th July, 1925.

Dr. W. J. Vickers as Medical Officer on 20th September, 1925.

Dr. R. M. Dannatt as Medical Officer on 10th October, 1925.

Dr. J. N. Banks as Medical Officer on 24th April, 1925.

Dr. J. F. S. Wiseman as Medical Officer on 9th April, 1925.

Dr. R. T. B. Green as Medical Officer on 13th June, 1925.

Dr. D. M. McSwan as Medical Officer on 17th July, 1925.

Mr. F. E. Byron as Chemist, I.M.R., on 19th October, 1925.

RESIGNATIONS.

Dr. J. F. S. Wiseman resigned on 28th July, 1925.
 Dr. R. P. Bliss resigned on 28th July, 1925.
 Dr. J. N. Banks resigned on 6th December, 1925.
 Dr. E. N. Graham, Chief Surgeon, resigned on 3rd February, 1925.
 Dr. H. M. Harrison, services terminated on 1st May, 1925.
 Dr. (Mrs.) A. G. McIlroy, services terminated on 16th December, 1925.
 Dr. E. A. O. Travers resigned the service on 10th September, 1925.

RETIREMENT.

Dr. C. T. Darwent, Medical Officer, retired on 29th July, 1925.
 Dr. H. P. Hacker, Malaria Research Officer, retired on 22nd August, 1925.

TRANSFERS.

Dr. H. G. Holdbrook was transferred to Malacca as Chief Medical Officer, with effect from 10th November, 1923.

ASSISTANT SURGEONS.

APPOINTMENTS.

The following were appointed during the year :

Mr. T. Arunugam on 2nd April, 1925.
 Mr. Tara Singh on 3rd April, 1925.
 Mr. A. R. Muthiah on 14th April, 1925.

RESIGNATIONS.

Mr. A. C. Karthigasu, Assistant Medical Officer, resigned on 16th November, 1925.
 Mr. A. Anugraham, Assistant Surgeon, resigned on 18th September, 1925.

NURSING SISTERS.

APPOINTMENTS.

Miss A. V. Jackson, Nursing Sister, on 3rd January, 1925.
 Miss M. G. Hobkirk, Nursing Sister, on 22nd March, 1925.
 Miss E. O'Rafferty, Nursing Sister, on 28th February, 1925.
 Miss M. Kaylor, Nursing Sister, on 27th February, 1925.
 Miss E. L. Crocker, Nursing Sister, on 4th April, 1925.
 Miss J. D. Scott, Nursing Sister, on 2nd May, 1925.
 Miss E. Lampard, Nursing Sister, on 2nd May, 1925.
 Miss F. D. Howard, Nursing Sister, on 23rd May, 1925.
 Miss M. D. A. Day, Nursing Sister, on 13th June, 1925.
 Miss E. Arden, Nursing Sister, on 13th June, 1925.
 Miss A. D. Chappell, Nursing Sister, on 25th July, 1925.
 Miss E. Nicholson, Nursing Sister, on 14th August, 1925.

PROMOTIONS.

Miss E. J. McCarthy promoted to Matron, Grade I, on 3rd December, 1925.
 Miss A. M. Johnson, Sister, promoted to Matron, Grade II, on 3rd December, 1925.

RETIREMENT.

Miss A. M. McBride, Matron, Grade I, retired on pension on 3rd December, 1925.
 Miss C. Kemp, Sister, resigned on expiration of her agreement on 19th December, 1925.

RESIGNATIONS.

Miss A. G. Boyed, Nursing Sister, resigned on 17th January, 1925.
 Miss C. F. Johnson, Nursing Sister, resigned on 21st April, 1925.
 Miss E. M. Hayes, Nursing Sister, resigned on 17th July, 1925.
 Miss McInnes Paterson, Nursing Sister, resigned on 17th February, 1925.

FINANCIAL.

3. (a) Statement of Revenue for the year 1925—	
Revenue (Hospital fees, licences, etc.)	... \$ 305,578.48
(b) Statement of Expenditure for the year 1925—	
Personal Emoluments and Other Charges	... 3,931,202.11

II.—P U B L I C H E A L T H .

(a).—GENERAL REMARKS.

4. No laws affecting public health were enacted during the year under review but a Committee sat to draft an Enactment which, if passed by the Federal Council, will give effect to the recommendations of the Estates Health Commission.

5. (i) Immigration and emigration affected the population to a greater degree than the births and deaths. Immigration of any but estate labourers, who pass through the quarantine camps, is impossible to check and figures are not available.

(ii) Deaths recorded against towns are calculated on a basis of three months' residence. The rural population come into the towns when ill or into the hospitals situated in the towns, therefore this rule is calculated to show truer results than the crude death-rate.

(iii) In spite of a year remarkable for heavy floods and increased areas for mosquito breeding, the health of the country continues to improve. The general death-rate was 23.60 per mille, the lowest on record, as against 23.68 per mille for 1924, which was itself a record figure.

(iv) Diseases and death-rates of diseases : Fevers (mostly malarial) 14,377 deaths, a 42.09 per cent. of the total deaths, against 42.53 per cent. for 1924.

Bowel complaints	...	...	...	...	5.69 per cent.
Tuberculosis, pulmonalis	...	...	...	...	5.86 „
Pneumonia	...	...	...	...	5.49 „
Convulsions (causes various)	...	...	...	...	11.44 „

Since the founding of the Health Branch in 1911 there has been a steady decline in the death-rate. The figures given below are instructive :

Year.	Federal.		Kuala Lumpur Town.		Estates.	
	General death-rate.	Fevers death-rate.	General death-rate.	Fevers death-rate.	General death-rate.	Fevers death-rate.
1911 	39.11	17.47	39.02	9.87	62.90	Not known
1925 	23.60	9.93	15.31	1.46	11.95	3.28

The figures of Asiatic-owned estates must be accepted with great caution as returns and death-rates are seldom accurate and often ignored altogether.

(v) Total population of the Federated Malay States estimated up to the end of June, 1925, was 1,447,243.

(vi) Births.—The number of births registered was 41,818 for the whole year, giving a rate of 28.89 per mille of population, as against a birth-rate of 27.86 per mille for 1924.

The number of deaths of children under one year was 7,409 or an infantile mortality rate per thousand births of 177.17 against a mortality rate of 180.53 in 1924. This death-rate, which it is hoped will be reduced in the course of time, compares favourably with those of other tropical countries.

The death-rates of the four States were :

INFANTILE MORTALITY TABLE.

State.	Deaths of children under 1 year of age.	Death-rate per 1,000 births.
Perak 	2,964	165.88
Selangor 	2,359	177.96
Negri Sembilan 	1,108	200.65
Pahang 	978	189.10

That of Negri Sembilan is the highest and this may be due to the overcrowding in the towns and villages and to the fact that a large proportion of the inhabitants are small cultivators, there being little mining in the State, while this class of person does not materially benefit from the enhanced price of rubber in many cases. Also for the greater part of the year there was no Infant Welfare Centre in Seremban, the chief town.

(vii) The only deaths from zymotic diseases were one from cholera in Perak, ten from smallpox and seven from cerebro-spinal meningitis.

As many ships from India arrived cholera infected, the Health Branch deserve to be congratulated on their work.

TABLE SHOWING CORRECTED DEATHS AND THE DEATH-RATES FROM PRINCIPAL DISEASES.

Towns.	Malaria.		Dysentery and diarrhoea.		Pulmonary tuberculosis.		Beri-beri.	
	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.
Kuala Lumpur	138	1.46	108	1.14	166	1.75	22	0.23
Ipoh ...	75	1.77	28	0.66	64	1.51	7	0.17
Taiping ...	62	2.85	96	4.40	83	3.81		
Seremban ...	54	2.58	34	1.62	57	2.72	7	0.33

(b). SICKNESS AND DEATH-RATES IN HOSPITALS.

6. The number of in-patients treated in hospitals was 103,762 with 6,964 deaths and a death-rate of 6.71 as compared with 90,883 with 6,853 deaths and a death-rate of 7.54 in 1924.

The distribution of patients in the different States was as shewn below :

States.	1924.			1925.		
	Cases.	Deaths.	Death-rates.	Cases.	Deaths.	Death-rates.
Perak	41,102	3,091	7.52	46,551	3,198	6.87
Selangor	30,192	2,186	7.24	34,768	2,172	6.24
Negri Sembilan	13,354	1,079	8.08	14,684	1,090	7.04
Pahang	6,235	497	7.97	7,759	504	6.49
Total ...	90,883	6,853	7.54	103,762	6,964	6.71

7. There was again an increase in the number of patients treated in hospitals but a lower death-rate. This must be regarded as satisfactory and to a great extent due to the efforts of the hospital staffs.

8. The principal diseases commonly treated in hospitals were malaria, venereal diseases, ankylostomiasis, dysentery, diarrhoea, beri-beri, pneumonia and pulmonary tuberculosis.

The following table shows the number of cases and deaths during the years 1924 and 1925 :

Diseases.	1924.			1925.		
	No. of cases.	No. of deaths.	Percentage of deaths.	No. of cases.	No. of deaths.	Percentage of deaths.
Malaria	18,045	852	4.72	23,056	993	4.03
Venereal diseases ...	3,588	50	1.39	3,688	91	2.46
Ankylostomiasis ...	3,334	204	6.11	3,309	190	5.74
Dysentery	3,218	649	20.07	2,694	549	20.38
Diarrhoea	1,353	94	6.89	1,387	89	6.41
Beri-beri	991	120	12.10	906	98	10.81
Pneumonia	1,811	745	41.13	1,922	779	40.52
Pulmonary tuberculosis	2,375	1,037	43.66	2,571	1,051	40.88

MALARIA.

9. The number of cases treated in hospitals shows an increase, but a slightly lower death-rate. The increase in malaria is probably due to a variety of causes. The increase in immigration due to the greater prosperity of the country and the increase in migration from place to place and the unprecedented floods, without doubt, were all factors in the increase in the figures for malaria. It was found that larvæ had been swept down from unprotected areas, and anopheline larvæ were found in the lake in the Gardens in Kuala Lumpur and some cases of fever were traced to this cause.

In the hope of obtaining more accurate information, malaria was made notifiable in certain towns. The results have not been entirely satisfactory. Practically speaking the only persons who notified cases were Medical Practitioners and Medical Officers in charge of hospitals. Not infrequently the information given on the notification card was so inaccurate as to serve no useful purpose and at times it was quite misleading. Every case notified was investigated with a view to ascertaining the source of the infecting anophelines.

The number of deaths registered during the year as due to fever was 14,377, giving a death-rate per mille population of 9.93 which is the lowest ever recorded.

Several larvicides were experimented with including Paris Green, cresol soaps, and oil obtained from the distillation of rubber. Taking all facts into consideration, none were found to have any advantage over petroleum.

Tablets of quinine to the number of 460,000 were issued to the various Health Officers for ultimate free distribution to the public through the Police, the Education Department, and the District Officers, also to the Senior Medical Officers for distribution through the various travelling dispensaries.

VENEREAL DISEASES.

10. The total number of cases treated during the year 1925 was 3,688 cases with 91 deaths and a death-rate of 2.46 per cent.

The remarkable success which has attended the efforts of the Venereal Disease Specialist calls for special comment. It is due to the untiring energy and an enthusiasm on his part, organising power and above all to a thorough knowledge of his extensive subject.

The instruction of the staff in modern methods has had beneficial results. The public have been given lectures illustrated by lantern slides, a good number of which were locally photographed, and the attendances have been very numerous coinciding with a large increase in the numbers of patients going to the clinic. Many patients bring their friends. Propaganda, pamphlets and posters issued by the Committee for Public Health Education have also been useful. The hospital wards and clinics are made use of to educate the public as well as for treatment.

It is necessary however to conceal the treatment centres by associating them with the Town Dispensaries in such a fashion that no patient suffering from venereal diseases is labelled as such. It is hoped to organise a chain of venereal disease centres throughout the Federated Malay States as soon as circumstances will permit of it.

The first Venereal Disease Clinic was started in 1923. The attendances at the Kuala Lumpur Clinic were 2,328 in 1925 and 29,335 at the Town Dispensary. Centres are being organised at Ipoh, Seremban, Taiping and Klang; others will come later.

At the smaller stations sub-centres exist. The Venereal Disease Specialist puts up an instructive graph in colours showing the incidence of venereal disease at various places. All races have been represented at the Kuala Lumpur Clinic and both sexes. Treatment is given free.

Of 27 prostitutes sent for examination all were found to be infected with venereal disease. The Venereal Disease Specialist has had much success in treating granuloma inguinalae and gives details of his methods.

Interesting particulars of the treatment of other conditions met with are furnished by the Venereal Disease Specialist. A word must be added in praise of the staff he has trained and the care and pains taken by him to write and illustrate his Annual Report which is published as an appendix to this report.

Injections of arsenical compounds are given at all hospitals and dispensaries. The following are the figures for the different States :

States.				1923.		1924.		1925.
Perak	...	...	...	15,550	...	14,217	...	15,913
Selangor	...	...	...	10,282	...	10,525	...	9,581
Negri Sembilan	...	...	...	2,739	...	3,244	...	3,091
Pahang	...	...	...	1,104	...	2,030	...	2,068
Total				29,675	...	30,016	...	30,653

ANKYLOSTOMIASIS.

11. A total of 3,309 cases were treated in 1925 as compared with 3,334 cases in 1924. These figures are only for cases who were treated for this disease alone.

A successful experiment in massed treatment was carried out at Kuala Pilah on the lines precisely the same as those suggested for the whole country in 1924, but which were not accepted by the Government. The methods were those of the Rockefeller Foundation in both cases.

DYSENTERY AND DIARRHOEA.

12. The total number of cases treated in hospitals was 4,081 with 638 deaths and a death-rate of 15.63 per mille as against 4,571 cases with 743 deaths and a death-rate of 16.25 for 1924. The types were as follows :

States.	Amoebic.	Deaths.	Bacillary.	Deaths.	Diarrhoea.	Deaths.
Perak	730	122	589	140	665	52
Selangor	258	48	462	125	438	25
Negri Sembilan ...	200	45	190	48	173	5
Pahang	53	7	83	14	67	7
Total ...	1,241	262	1,324	327	1,343	89

The difficulty in treating these diseases is to get the patients into hospital in time. Undoubtedly many go on in a sprue-like condition. The treatment by parathyroid extract and calcium lactate continues to give good results in some chronic cases not typically sprue. The Director of Government Laboratories report gives some remarks on the value of serum treatment.

BERI-BERI.

13. The number of cases treated for this disease was 906 with 98 deaths and a death-rate of 10.81 as compared with 991 cases and a death-rate of 12.10 for the corresponding period of 1924.

The prosperity of the country probably accounts for the lowered incidence and death-rate, but in spite of all that can be done to the contrary more and more people eat polished rice, which is more attractive as a food, if less healthy as a diet. Even Malays have taken to it.

The most satisfactory treatment seems to be a combination of extract of polishings, marmite and fresh cow's milk.

Fulminating cases are seldom if ever seen now, and at the moment the danger from beri-beri does not arise. Propaganda in the form of pamphlets and advertisements in the vernacular press warning the public of the danger of using polished rice, were issued by the Committee for Public Health Education.

PNEUMONIA.

14. The number of cases treated was 1,922 with 779 deaths and a death-rate of 40.52 as against 1,811 cases in 1924.

Opinions as to the value of the iodine treatment vary remarkably but on the whole they are mildly favourable to it. Again our difficulty is to get the patients into hospital early enough.

PULMONARY TUBERCULOSIS.

15. The number of cases treated in hospitals during the year under review was 2,571 cases with 1,051 deaths and a death-rate of 40.88 per mille as compared with 2,375 cases with 1,037 deaths and a death-rate of 43.66 per mille for 1924.

The tuberculosis incidence does not vary from year to year to any appreciable degree and while the disease needs carefully watching there is no occasion for alarm. The influx of infected Chinese immigrants through Singapore is a possibility which requires consideration. The amount of tuberculosis is far less than in most tropical countries however. The question of sanitoriums for consumptives has been carefully considered but experience in other countries does not hold out much hope of advantage from them, and notification has signally failed. It is hoped to concentrate cases of tuberculosis in one place as soon as the buildings are ready.

All that can be done in the form of propaganda and education is being done by the Public Health Education Committee but the hope of finding and detaining early cases must be dismissed as chimerical.

In French and Belgium Congo where the strictest laws exist it has been found impossible to apply them or to control the disease.

SMALLPOX.

16. The total number of cases notified during the year was 49 with 10 deaths as compared with six cases and one death for the year 1924. The distribution of these cases was as follows:

Thirty-nine cases in Perak, six in Selangor, two in Negri Sembilan and two in Pahang.

Enquiries into smallpox vaccine are being conducted by the Director of Government Laboratories and pathological specimens to the number of 277 were examined.

TYPHUS FEVER.

17. Forty-eight cases were diagnosed at the Institute for Medical Research during the year. Agglutination reactions indicated that there are two distinct strains. The clinical symptoms of both seem to be the same. There were three fatal cases during the year. The disease was distributed racially as follows:

Thirteen were Punjabi cart drivers, twenty-eight were Tamils, four Europeans, two Malays and one Chinese. The disease does not appear to be directly infectious. Only one patient remembers being bitten by any insect, in this case a bug.

It has not so far been possible to transmit the disease to animals.

ENTERIC FEVER.

18. There were 116 cases treated in hospitals with 34 deaths during the year under review distributed as follows:

States.	Cases.	Deaths.
Perak	51	16
Selangor	24	4
Negri Sembilan	32	10
Pahang	9	4
Total ...	116	34

The death-rate and incidence of this disease remain remarkably low for a tropical country.

DYPHTHERIA.

19. There were 16 cases with 8 deaths during the year 1925. There were 35 cases notified during the year. This being no change in the position. The remarks in the Director of Government Laboratories report are instructive in this connection. Introduced probably by carriers from India and China this disease, formerly almost unknown, appears to be established in the Federated Malay States.

YAWS.

20. The treatment of yaws by injection of arsenical compounds was continued. A total number of 32,396 injections were given during the year under review. The number of cases treated in each State is shown in comparison with the number treated in 1923 and 1924 in the following table:

States.	1923.	1924.	1925.
Perak	14,149	9,884	9,155
Selangor	4,381	2,231	1,305
Negri Sembilan	9,358	7,267	6,426
Pahang	3,247	3,997	9,403
Total ...	31,135	23,389	26,289

The campaign against yaws has been very successful but it must continue for many years to come and the Pahang figures contradict the opinions of optimists, nor do they confirm the alleged value of the yaws register proposed for use.

INFLUENZA.

21. There were 4,825 cases with 30 deaths as compared with 3,825 cases with 58 deaths in 1924. They were distributed as follows :

States.	Cases.	Deaths.
Perak	1,738	—
Selangor	1,954	12
Negri Sembilan	582	16
Pahang	247	2
	—	—
Total ...	4,521	30
	—	—

Influenza is prevalent in the Federated Malay States but usually of a mild type, its chief danger is the tendency to give rise to infection by the tubercle bacillus later on.

EYE DISEASES.

22. *Out-patients.*—The number of new cases during the year at the Eye Clinics was as follows :

Kuala Lumpur	1,369
Ipoh and Taiping	3,097

There were 23,220 attendances as compared with 13,240 for 1924. These clinics have proved of extraordinary value and a member of the senior staff, Dr. H. R. Dive, has just obtained the Diploma of Ophthalmic Medicine and Surgery of London and the certificate from the Royal London Ophthalmic Hospital and is likely to add greatly to this valuable work.

In-patients.—One thousand and seventy-one cases were admitted into hospital, as compared with 769 cases during the year 1924. The chief diseases met with were conjunctivitis, trachome, gonorrhoeal-ophthalmia, ulcers and opacities of cornea, cataracts, neuro-retinitis, glaucoma and injuries of cornea and eye ball, resulting from accidents chiefly amongst the workmen in factories and metal quarries, and burns from acids and corrosives. Particular mention must be made of a case of burns by strong acid in a Chinese, resulting in apparent loss of vision of both eyes. This man, thanks to the promptness with which he was brought to hospital, was fortunate in regaining his vision in both eyes with no impairment, after prolonged treatment for about 6-8 weeks.

During the year under review there were two epidemics of ophthalmia, occurring in the first and last quarters of the year. The disease seemed to set in with inflammation of the outer angles of one eye, spreading gradually to the rest of the eye and in most cases to the opposite eye. The organisms were found to be a mixture of Morax-Axemfield's and Kock Week's bacilli, the severity or otherwise depending on the preponderance or not of the latter organism. The usual length of the affection was about 7-14 days; occasional use of weak solutions of silver nitrate and frequent use of the organic salts gave satisfactory results.

Eye Operations.—A total number of 561 operations were performed during the year and were as follows :

MAJOR.

Plastic operations on lids for Entropion, etc.	8
Dacryocystectomy (Removal of sac)	4
Pterygium (Transplantation)	10
Iridectomy	32
Paracentesis of Act. Chamber	2
Cataract	69
Removal of Epithelioma, etc.	2
Evisceration	5
Enucleation	7
	—
Total ...	139
	—

MINOR.

Removal of foreign body conjunctiva	...	...	...	...	13
Removal of foreign body cornea	...	...	...	...	50
Needling	...	...	...	...	26
Dissecting Leuroma	...	...	...	...	5
Peritony for Pannus	...	...	...	...	4
Sub-conjunctival injections	...	...	...	...	217
Stye Abscess	...	...	...	...	37
Chalazion	...	...	...	...	7
Meibomian Abscess	...	...	...	...	9
Meibomian cyst	...	...	...	...	3
Tarsal Abscess	...	...	...	...	1
Lachrymal Abscess	...	...	...	...	3
Paracentesis	...	...	...	...	15
Dilation Caniculus	...	...	...	...	14
Dissection Pterygium	...	...	...	...	3
Separation of adherent lid	...	...	...	...	3
Cauterizing iris	...	...	...	...	4
Tattooing	...	...	...	...	2
Multiple incision conj.	...	...	...	...	2
Prolapse Iris nipped	...	...	...	...	1
Chalazian scrapped	...	...	...	...	1
Adhesion nipped under Cocaine	...	...	...	...	1
Ulcer touched with Tr. Iodine	...	...	...	...	1
Total					422

SURGERY.

23. *Operations.*—The number of operations undertaken during the year is shewn below :

States.	Major.		Minor.	
	1924.	1925.	1924.	1925.
Perak ...	380	344	2,623	2,229
Selangor ...	382	334	1,379	1,579
Negri Sembilan ...	86	86	1,098	1,618
Pahang ...	13	12	282	296
Total ...	861	776	5,382	5,722

The surgical work was of a high order and the Surgeons are to be congratulated on their results. A highly qualified and very skilful surgeon joined the staff during the year and is available when one or other of the surgeons is on leave. The reports of the Chief Surgeons, Perak and Selangor, are attached as appendices.

All surgical knives are now sharpened locally on a leather wheel electrically driven. This was arranged and fitted by the Radiologist. It is worked by an ex-hospital patient who was formerly unable to earn his living. The result has been a great saving in cost and a gain in efficiency.

Surgical instruments are replated when they require it by one of the Kuala Lumpur firms. The plating stands antiseptics very well and a large saving in cost and freight charges has been effected.

VACCINATION.

24. During the year 1925 the number of vaccinations performed was 126,305 as compared with 78,407 for the corresponding period of 1924. The following are the figures for the various States.

States.	1923.	1924.	1925.
Perak ...	53,926	54,278	86,125
Selangor ...	11,075	11,745	26,369
Negri Sembilan ...	6,366	6,563	8,268
Pahang ...	6,357	5,821	5,543
Total ...	77,724	78,407	126,305

WOMEN'S HOSPITALS AND WARDS.

25. The work of the women's hospitals has been very satisfactory and is gaining in popularity. A Lady Medical Officer was stationed at Pekan on the East Coast of Pahang and is doing good work there and gaining the confidence of the Malays by degrees. One point to remember is that apart from Infant Welfare Centres, Lady Medical Officers cannot work without a hospital or wards.

CHILDREN'S WARDS.

26. The population are not yet sufficiently educated to leave children in the wards as experiments have proved, and in ninety-nine cases the mother and perhaps two or more healthy children have to be admitted with each sick child. The General Hospital, Kuala Lumpur, suffered as to its death-rate by the admission of moribund children, whose condition was largely due to ignorance and parental neglect.

INSPECTION OF SCHOOLS.

27. The general sanitary condition of many schools is still far from satisfactory, particularly with regard to water supply and latrine accommodation.

Enlarged spleens and scabies are the commonest conditions met with.

This work is carried out partly by the Health Branch and partly by the curative branch of the department. The inspection of schools is greatly handicapped by shortage of staff. It should be carried out entirely by the Health Branch and by Medical Officers appointed for this special purpose.

LEPER ASYLUMS.

28. *Kuala Lumpur*.—The total number of lepers treated during the year was 635 with a death-rate of 4.88 per cent., one of the remarkable features are the numbers of voluntary admissions. The report of the Medical Officer in charge of the Asylum is put up as an appendix.

There is urgent need of a new Leper Colony and a site has been chosen and preliminary work commenced. When completed it should be a model colony.

Pulau Pangkor Laut.—In this Asylum, which is for Malays only, 62 cases of leprosy were treated with eight deaths during the year under review. The same treatment as that adopted in Kuala Lumpur was carried out here with fair results.

Taiping Leper Wards.—During the year 202 cases were treated with 18 deaths. It is hoped shortly to close this asylum and remove the patients to Kuala Lumpur.

X-RAY AND ELECTRICAL TREATMENT.

29. Dr. C. F. Constant was the Radiologist throughout the year. The figures given below show the actual number of patients treated or examined :

Radiology	...	...	...	...	...	...	...	...	885
Therapy	...	...	...	...	...	...	...	...	16

The report is put up as an appendix. The new and urgently needed Radiological department is well on the way to completion. X-Ray departments will be opened in Ipoh and Seremban in 1926. The Radiologist has given time and trouble to the building up of X-Ray sets, and has saved the Government large sums of money. He deserves great credit for his admirable work.

The new Radiologist's block promises to be second to none in the East.

(c).—VETERINARY BRANCH.

30. *Rinderpest*.—Outbreaks of the disease occurred in Selangor and Pahang causing the loss of 205 buffaloes and 12 oxen. Inoculation with anti-rinderpest serum was carried out with success. There were no cases of rinderpest in Perak and Negri Sembilan.

Foot-and-Mouth Disease.—Outbreaks of foot-and-mouth diseases occurred in the various districts and quarantine stations, a total of 2,171 cattle were affected and there were 19 deaths, the disease was of a mild type in all cases.

RABIES.

Canine rabies again appeared in Selangor after an interval of over two years, Kuala Lumpur and Sungei Besi being the areas affected. The first case is said to have occurred in a dog belonging to a travelling circus, but this could not be definitely proved. Altogether eight cases came under observation, the outbreak lasting from March to September. Six hundred and fifty-one dogs were inoculated with anti-rabic vaccine prepared by Dr. A. Neave Kingsbury at the Institute for Medical Research. No cases of rabies are known to have occurred amongst vaccinated dogs though they were mostly animals kept in the vicinity of places where rabies had occurred or were animals which had been bitten by unknown dogs.

In one case, out of 20 dogs kept in a kampong, where a case of rabies had occurred, 18 were vaccinated, but two escaped vaccination and one of these subsequently developed rabies. A fee of \$1 per animal was charged at first, but free vaccination was granted by Government when the advantages which this system promised were pointed out. No great difficulty was experienced in persuading people to have their dogs vaccinated. Vaccination should prove a valuable addition to the methods employed in dealing with outbreaks of rabies. It is not claimed that it is infallible, but neither are any other methods which can be employed.

The number of places outside Selangor in which canine rabies has occurred during the past year (in addition to the fact that outbreaks have occurred in some part of Malaya at fairly frequent intervals during the past 20 years or more) lends support to the view that the disease is endemic in Malaya, and this view should be taken into consideration when framing inter-State regulations for the movement of dogs.

SWINE FEVER.

Three outbreaks of this disease occurred during the year, one in Selangor with five cases of which four died and two in Pahang with thirty-one cases with twenty-three deaths. The remaining eight pigs were destroyed.

SURRA.

One case of Surra occurred in Taiping, Perak.

VETERINARY QUARANTINE STATIONS.

Port Swettenham.—Nine thousand nine hundred and seventy-eight animals were imported *via* Port Swettenham, of which number 4,490 were quarantined for 10 days. Seven outbreaks of foot-and-mouth disease affecting 112 animals occurred amongst cattle newly imported from India.

Bukit Sentul.—Seven hundred and fifty-seven cattle imported by train, mostly from Singapore, were quarantined here.

Kuantan.—Seven hundred and nine animals passed through the Baloh quarantine station during the year under review.

Perak.—

Port Weld	...	...	...	...	...	...	...	...	2,098
Parit Buntar	...	...	...	...	...	...	...	...	549
Selama	...	...	...	...	...	...	...	...	1,329
Telok Anson	...	...	...	...	...	...	...	...	926

Negri Sembilan.—Two thousand three hundred and twenty-two animals passed through the quarantine stations in Negri Sembilan.

VETERINARY PROSECUTIONS.

There were a total of 1,440 prosecutions resulting in 1,399 convictions. The fines imposed amounted to a total of \$13,258.

(d) GENERAL EUROPEAN AND NATIVE POPULATION.

31. The general health of the European population continues to be good. There was little sickness and invaliding. The total European and American population as estimated at the end of June, 1925, was 6,708. There were 139 births, giving a birth-rate of 20.72 per mille and 27 deaths with a death-rate of 4.03 per mille as compared with a birth-rate of 17.32 per mille and a death-rate of 5.57 per mille in the previous year.

Vital statistics, estimated native population for the year, birth and death-rates, infantile mortality, etc., will be found in the report of the Senior Health Officer, Federated Malay States, which is appended.

III.—SANITATION.

32. The Health Branch of the Medical Department was greatly handicapped in its activities by shortage of staff. During the year only one Health Officer was recruited. The position is as follows :

Health Officers	...	...	...	...	...	...	...	6
Medical Officers lent by the Curative Branch	...	...	...	...	...	...	...	5

The senior staff recommended by the Medical Enquiry Committee is :

Chief Health Officer	...	...	...	...	...	...	...	1
Senior Health Officers	...	...	...	...	...	...	...	3
Health Officers	...	...	...	...	...	...	...	22
Chief Sanitary Inspectors	...	...	...	...	...	...	...	8

Until this branch is fully staffed by qualified Health Officers it is impossible to carry out the work and the health and general sanitation of the Federation suffers. The branch can be congratulated on the results achieved in the face of great difficulties.

33. The authorised staff of Chief Sanitary Inspectors is three, but two were on leave in Europe or seconded to Sanitary Boards throughout the year, leaving only one officer available for duty with the Health Branch.

34. From an authorised staff of 28 Asiatic Sanitary Inspectors eight were absent in Singapore for half the year attending a course of instruction at the Sanitary Inspectors' School. This made it extremely difficult to carry out the Sanitary Inspectors' duties with the depleted numbers.

35. The Committee which sat to enquire into the working of the Federated Malay States Medical Department remarked that "The division needs both strengthening and regrading" and no comment was ever more true. The Committee's report is before the public.

36. The Registration of Births and Deaths was kept up to date, but shortage of staff and heavy routine duties made it impossible to analyse the results satisfactorily.

37. Anti-malaria work and mosquito destruction was carried out throughout the year, but shortage of staff made teaching and investigation by Health Officers almost impossible.

38. There were no epidemics of any importance during 1925, and not a single case of plague was reported.

39. Shortage of officers made it impossible to do much work under the Enactment controlling the Sale of Food and Drugs. Work under the Labour Code and school inspections suffered severely from the same cause.

HEALTH IN TOWNS.

40. Taiping has the highest malaria rate, possibly due to its high rainfall and low level of the ground. It also heads the list for bowel complaints and tuberculosis. The town is old, the houses out-of-date, back-lanes and ventilation are largely absent, the land is water-logged and there is overcrowding in the Asiatic houses. The latter cause probably largely explains the tuberculosis rate in all the towns. It is a matter which calls for the urgent attention of the Sanitary Boards and early remedial measures.

Asiatic business communities as a rule live in the premises where their businesses have grown up and overcrowding is inevitable as the business increases and extra hands are engaged, but the accommodation remains the same. The total death-rates for the four large towns have not materially increased, and generally speaking have fallen.

QUARANTINE.

41. The Quarantine Camp, Port Swettenham, passed 49,529 persons through its wards. There were 184 cases of cholera with 63 deaths, giving a death-rate calculated on cases of 34.23 per cent., when it is remembered that women and young children, weakened by a sea-voyage, are included in these figures, the results are highly satisfactory. The most modern forms of treatment were carried out. The only case of cholera notified throughout the year as occurring outside the quarantine camp had not entered the country through Port Swettenham.

The total percentage death-rate amongst the immigrants from all causes was 0.42. Ankylostomiasis treatment was given in India before embarkation at the Camps and again at Port Swettenham.

42. The only helminthic disease of importance from a health point of view is ankylostomiasis. At least 90 per cent. of the native population harbour the worm in small numbers but few have sufficient to give rise to symptoms. All immigrants quarantined at Port Swettenham receive anti-ankylostome treatment.

SCAVENGING AND DISPOSAL OF NIGHT SOIL, DRAINAGE, ETC.

43. In most towns and villages under Sanitary Board control the scavenging is well done. Disposal is by incineration, dumping or the filling of swamps. The last two methods are apt to promote fly breeding.

44. Up to date no town in the Federated Malay States has a water carriage system. There are a number of private installations working satisfactorily and their number is increasing. In Kuala Lumpur a small activated sludge plant is being constructed near the Institute of Medical Research. It is proposed to give this a thorough trial and to have the effluent frequently examined both chemically and bacteriologically and if it proves a success to employ the system in other parts of the town.

45. The system in use in most towns is the two-bucket system for the shop-houses, and pit latrines for bungalows standing in their own compounds. Most of these pit latrines form fly-breeding grounds and they are therefore unsatisfactory. Petroleum, lime and other larvicides have been used but unless applied lavishly do not prevent breeding.

46. A number of bungalows are being provided with a septic tank system having an overflow into the surface drains. So far no nuisance has occurred and the system may therefore be described as satisfactory.

47. The ultimate disposal in the bucket system is by trenching. If not carefully watched it becomes short circuited to the Chinese vegetable gardeners who use crude night soil as manure and whose gardens are a source of danger and a fertile breeding place for flies.

The street drains are under the care of the Sanitary Boards, and the Mosquito Destruction Boards are responsible for anti-malarial drains together with the anti-malaria branch of the Public Works Department, who have many miles of anti-malarial pipe lines. Clearance of bush requires great care as it may be followed by the introduction of *A. maculatus* if near foot-hills, the worst malarial carrier in the Federated Malay States.

WATER SUPPLIES.

The town water supplies are usually of good quality obtaining their water from large catchment areas which require careful policing and control. The catchment areas are under the care of the Forest Department and the reservoirs under that of the Public Works Department advised by the Health Branch of the Medical Department. Filters both slow and rapid are in use in some cases and in others are not considered necessary. Mechanical filters of some pattern should replace the sand filters in use in places.

The water supplies on estates greatly vary, on some they are excellent but on others much the reverse.

Through lack of staff the work under the Labour Code suffered throughout the year. The death-rate on estates has dropped from 62.9 per mille in 1911 to 10.81 per mille in 1925.

As mines are not required to furnish returns figures of the mining industry are not available.

PUBLIC HEALTH EDUCATION.

48. Propaganda by means of posters, pamphlets and advertisements in the local press issued by the Malaria Advisory Board, Committee for Public Health Education and Infant Welfare Advisory Board continued during the year.

Lantern lectures on malaria in Malay and Chinese were given in schools, kampongs and mines throughout the Federated Malay States.

Lectures illustrated by lantern slides on venereal diseases were given in Chinese, Tamil and other clubs.

Exhibits of anti-malarial measures and Infant Welfare work were put up at Kuala Lumpur, Taiping and Ipoh. These exhibits were very popular and attracted great attention. They were visited by all classes.

The following pamphlets and posters were issued during the year: Copies.

1.	“Anti-Malaria work at Port Dickson,” with illustrations by Capt. L. D. Gammans	... ..	1,000
2.	“The Puru of Malaya, its Treatment and Eradication,” with illustrations by Dr. A. Visuvalingam	... ..	1,000
3.	“Leprosy—The Results of the Tai Fong Chee Treatment,” with illustrations	... ..	1,000
4.	“Rabies” (Hydrophobia) in four languages—		
	Handbills	... ..	15,000
	Large posters	... ..	5,000
5.	“Beri-Beri” in English	... ..	10,000
6.	„ in Chinese	... ..	10,000
7.	„ in Jawi	... ..	10,000
8.	„ in Tamil	... ..	10,000
9.	„ in four languages in poster form	... ..	3,000
10.	“How to Use a Mosquito Curtain” (Illustrated in English)	...	5,000
11.	„ „ „ in Chinese	...	5,000
12.	„ „ „ in Tamil	...	5,000
13.	“How to Use a Mosquito Curtain” Illustrated in Romanised Malay	... ..	10,000
14.	“Dangers of Tetanus Neonatorum” in Jawi	... ..	2,500
15.	„ „ in Tamil	... ..	2,500
16.	“Dangers of Whooping Cough” in Chinese	... ..	5,000
17.	„ „ in Tamil	... ..	2,000
18.	„ „ in Jawi	... ..	1,000
19.	“Domestic Hygiene” in four languages (5,000 copies each)		20,000
20.	“Hints to Nursing Mothers” (Poster) in four languages	...	100
21.	“Weaned Babies” (in four languages) (Poster)	... ..	100
22.	“Hints to Expectant Mothers,” in four languages (Poster)		100
23.	“Venereal Diseases” poster in Chinese (By Dr. Smith) in four kinds	... ..	650

The following pamphlets and posters were reprinted:

1.	“Malaria” in English and Chinese	... ..	20,000
2.	„ in English and Jawi	... ..	10,000
3.	“A Few Works on Venereal Disease” in English	... ..	10,000
4.	“A Few Works on Venereal Disease” in Jawi and Romanised Malay	... ..	10,000
5.	“A Few Works on Venereal Disease” in Tamil	... ..	10,000
6.	„ „ in Chinese	... ..	20,000
7.	“A Catechism of Consumption” in four languages	... ..	10,000
8.	“Consumption: Its Cause, its Cure and its Prevention,” in four languages	... ..	10,000
9.	“Hook-worm Disease or Ankylostomiasis” (in four languages)		10,000
10.	“Plague” in English	... ..	10,000
11.	“Opium Habit” in Chinese with illustrations	... ..	10,000
12.	“How to Use a Feeding Bottle” (Illustrated) in English, Chinese, Jawi, Romanised Malay and Tamil	... ..	300

IV.—RESUME OF METEOROLOGICAL CONDITIONS IN 1925.

49. Abnormally heavy rainfall was experienced during the year 1925. Returns from many stations shewed the highest rainfall on their records. In Perak, the stations shewed 24 per cent. above the average; Selangor 25 per cent. above; Negri Sembilan 23 per cent. above; and Pahang 15 per cent. above.

There was a great variation between some of the stations; for instance, Kuala Pilah showed 56 per cent. above the average, whereas at Grik the rainfall was only 4 per cent. above normal.

July and August were exceptionally dry months, but March and October were wetter than usual. The greatest excess, however, occurred during November; this was 130 per cent. above the mean, and though this was fairly general, Upper Perak had an excess rainfall of 4 per cent. only. The East Coast stations (Kuantan, Pekan and Rompin) were also only slightly above the average.

As might be expected, the temperature, during such a wet year, was below the average.

V.—HOSPITALS AND DISPENSARIES.

50. *Out-patients.*—The number of out-patients treated by all hospitals, dispensaries and travelling dispensaries for 1925 was 621,793 as compared with 584,261 in 1924. The following figures show the number treated during the past three years :

States.	1923.	1924.	1925.
Perak	190,990	221,096	216,282
Selangor	159,402	177,896	219,739
Negri Sembilan ...	92,692	96,432	99,047
Pahang	84,329	88,837	86,725
Total ...	527,413	584,261	621,793

Motor travelling dispensaries continued to do very good work in the villages and along road-sides, and the increased number of out-patients for the year under review is mainly due to these. Their programme is a fixed one and villages are visited at stated hours on certain days in the week.

They reach the rural population as nothing else has done and they are generally surrounded by a crowd of people at the halting places.

They have proved so successful that their number will be added to in 1926.

The travelling dispensary boats on the Pahang River continued to do very useful work; they treated 16,931 patients in 1925 as against 9,817 in 1924.

VI.—INFANT WELFARE WORK.

51. Infant Welfare work continues to be a great success and the attendances at the Clinics have greatly increased. The number attending at the Clinics in Kuala Lumpur, Ipoh and Taiping for 1924 and 1925 were as follows :

Place.	1924.	1925.
Kuala Lumpur	16,238	23,134
Ipoh	10,257	15,523
Taiping	7,342	18,259
Total ...	33,837	56,916

A commencement in Infant Welfare work was made in Seremban and it is hoped to open a centre in Teluk Anson during the next year. The control of Infant Welfare Centres is now under the Senior Health Officer. The centres are conducted by Lady Medical Officers with a staff of European Infant Welfare Sisters and Asiatic Health Visitors and Nurses. Admirable work has been done and the centres are very popular as the figures in the Lady Medical Officers' reports will show.

As was anticipated, they have become very large out-door Clinics for women and children, and for a time at least must remain so, for to refer patients to town dispensaries or hospitals means losing them.

On many of the rubber estates attention is being paid to maternity and infant welfare.

VII.—PRISONS.

52. During 1925 the general health of the prisoners and the sanitation of prisons have continued satisfactorily. The total number treated during the year in the different gaol hospitals was 953 with 16 deaths and a death-rate of 1.69 as against 933 with 15 deaths and a death-rate of 1.6 in 1924. They were distributed as in the following table :

Place.	1924.			1925.		
	Cases.	Deaths.	Per-centage.	Cases.	Deaths.	Per-centage.
Pudu Gaol, Kuala Lumpur ...	211	3	1.42	158	1	0.57
Gaol, Taiping ...	169	7	4.14	193	6	3.11
„ Batu Gajah ...	255	2	.78	273	3	1.10
„ Papan ...	15	...	...	This gaol is now closed.		
„ Seremban ...	208	1	.48	255	6	2.35
„ Kuala Lipis ...	42	1	2.38	54	...	...
„ Kuantan ...	33	1	3.03	20	...	...
Total ...	933	15	1.6	953	16	1.69

All new prisoners are kept under observation. Their blood and faeces are examined and they are vaccinated before being passed to labour.

VIII.—TEMPORARY CHINESE DECREPIT ASYLUM, PORT SWETTENHAM.

53. The camp was well maintained during the year. In July, owing to cholera in the quarantine camp, and increase in the number of immigrants, it became necessary to arrange accommodation so as to hand back some of the camps to the quarantine camp proper, from this date no more decrepits were admitted.

During the year 282 decrepits were admitted, 36 were discharged as fit for work, 31 were transferred, 119 absconded and 99 died, leaving 441 inmates at the close of the year.

The average monthly number of inmates was 510. The main causes of death were general debility 36, senility 30 and secondary anaemia 12.

About 30 per cent of the inmates were engaged in the making of bamboo baskets of all kinds, coir and rotan brooms and toys, etc., and earn from 10 to 20 cents each which enabled them to buy some extras, such as tobacco, etc.

IX.—CURE FOR OPIUM HABIT.

54. This costly experiment cannot be regarded as an unqualified success. Government paid all expenses and supplied special cooks and diets. No reliable figures giving statistics of cures have ever been produced, for patients cannot be traced after discharge, a fact admitted by every one.

Practically no patients seem to have regarded opium as a vice but rather as an expensive habit on which they spent money they would prefer to save.

During the slump years the wards were overcrowded by persons who amongst other reasons saw a chance of getting three weeks' living free; with the return of prosperity the numbers very rapidly reduced.

The test which is most reliable should be the numbers passing through the wards and the effect on the sale of opium.

In all 6,678 persons sought a cure since the wards opened. The statement appended below giving the sales of opium speaks for itself.

It would be quite unfair to consider the figures in relation to the Chinese population for the vast majority do not indulge in opium, but the "cures" ought to have materially reduced the sale of opium amongst the minority who do use it.

The remarks of the Medical Superintendent, Central Mental Hospital, in connection with opium and alcohol are well worthy of note.

STATEMENT OF CHANDU SOLD FROM 1ST MAY, 1924, TO 31ST DECEMBER, 1925.

1924.				Tahils C. H.		1925.				Tahils C. H.	
—	...	...	...	—	...	January	...	...	...	87,763	0 5
—	...	...	...	—	...	February	...	...	...	76,214	8 5
—	...	...	...	—	...	March	...	...	...	86,761	0 5
—	...	...	...	—	...	April	...	...	...	81,829	4 1
May	...	...	...	84,402	0 6	May	...	...	...	89,031	5 7
June	...	...	...	82,655	4 6	June	...	...	...	93,489	7 5
July	...	...	...	87,943	8 3	July	...	...	...	97,252	9 2
August	...	...	...	84,082	3 5	August	...	...	...	101,232	7 5
September	...	...	...	87,024	8 1	September	...	...	...	107,765	7 3
October	...	...	...	82,356	1 2	October	...	...	...	106,065	3 6
November	...	...	...	77,372	2 5	November	...	...	...	106,462	8 3
December	...	...	...	90,526	4 4	December	...	...	...	122,464	3 8

X.—SCIENTIFIC.

COMMENTS ON THE ANNUAL REPORT OF THE DIRECTOR OF GOVERNMENT LABORATORIES.

55. *Pasteur Institute*.—In the first two months only one person was treated at the Institute. A case of human rabies was diagnosed at the General Hospital, Kuala Lumpur, in March, the infection being probably conveyed by a travelling circus. This case ended fatally. The Veterinary Department and the public were promptly warned that rabies existed in Kuala Lumpur. Two persons who had been bitten by dogs were treated at the Institute. Seven dogs were found to be infected by laboratory methods. The disease was stamped out in due course. One case of rabies was imported to Perak from Selangor before the existence of rabies was recognised. This was the only case found in Perak. The Director of Government Laboratories remarks on the danger of rabies from Siam where the Buddhist Religion forbids the destruction of any animals. The number given Pasteur treatment in 1925 at the Institute was 123 and of these 64 had been exposed to known infection. No deaths amongst those treated have been recorded. Had the Pasteur treatment not been available, these 64 cases must have gone elsewhere at considerable risk due to delay.

The brains of 83 dogs were examined for negri bodies and of these 19 were positive.

PROPHYLACTIC CANINE VACCINE.

In Kuala Lumpur between 600 and 700 dogs were inoculated and 100 in the State of Kedah, no case of rabies occurred amongst the dogs vaccinated in Selangor. The Director of Government Laboratories report attached gives many interesting details.

Doctor Fletcher gives an interesting account of the treatment of malaria by secondary alkaloids of cinchona.

The Medical Officers of the hospitals throughout the Federated Malay States more or less agree that febrifuge, which contains the alkaloids, is as effective as quinine in *P. vivax* and *P. malariae* infections and less so in cases of *P. falciparum* judging by disappearance of the parasite from the peripheral blood. Doctor Fletcher concludes that in doses of grains ten, twice daily, the febrifuge is as effective as quinine. Peracrina 303 was experimented with but appeared to have no effect on any form of malaria. Mercurochrome 220 soluble was also tried without result beyond causing stomatitis.

Laboratory experiments tend to show that *P. falciparum* infections cause a higher degree of haemolysis than do the two other forms.

Competent fixation tests for malaria were not found to be of practical value in diagnosis, though some results were obtained.

The investigations into tropical typhus have been continued.

Dysentery.—Experiments with sera in dysentery cases gave no striking results. Stovarsol was found inferior to emetine treatment, though it may be of use in the more chronic cases.

Beri-Beri.—Experiments as to the value of extract of rice polishings and the polishing themselves were conducted in beri-beri cases.

General Paralysis of the Insane.—Cerebro-spinal fluids from the Central Mental Hospital showed that Malays, Chinese and Indians developed general paralysis of the insane in this country about equally.

Measles.—Interesting tests in the prophylactic use of serum from recovered cases of measles were satisfactory. Only a small percentage of inoculated persons developed measles, and those who did had mild attacks.

Melioidosis.—Melioidosis has now been reported from an Indian case in Tampin. It has also been recognised in Saigon. As the organism resembles that of glanders attempts were made to infect horses which failed. During the year a natural infection was recognised in a horse imported from Australia six months earlier.

Leplospirosis.—The existence of Weil's disease, spirochaetosis ecteroheomorrhagica has been suspected in Malaya and was proved to exist here during 1925, by the recovery of the infecting organism. It seems probable that the disease is common enough and in the past has been confounded with dengue and influenza.

Diphtheria.—Diphtheria has unfortunately become rather common in the Federated Malay States as remarked elsewhere. Enquiry in the schools goes to prove that the children here are as immune as those in Europe or America. The carrier rate and the virulence of the bacillus is about equal to those in Europe and America also. Tables are supplied in the Director of Government Laboratories report.

COMMENTS ON THE REPORT OF THE MALARIA RESEARCH OFFICER, INSTITUTE FOR MEDICAL RESEARCH.

56. Doctor Hacker retired on medical certificate in August. Complete lists of reports furnished by Captain Williamson will be found in the report of the Malaria Research Officer attached. Anti-malarial methods and apparatus were exhibited at Taiping, Ipoh and Kuala Lumpur and excited much interest.

The investigation into malaria in rice fields was proceeded with during the year.

Spleen rates in paddy neighbourhoods have been enquired into and samples of water examined to test their acidity with regard to larvae production.

A number of bloods have been examined and mosquitoes dissected to discover the degree of infection in Krian. In both cases it is very slight.

Seasonal and regional intensive surveys were made to determine the numbers and percentages of anopheline larvae in various places.

Figures are given for the percentage of larvae collected with regard to acidity of water and the abundance of larvae in rice fields. Captain Williamson draws some interesting conclusions from his observations.

Experiments are described which go to show that larvae or eggs taken from paddy fields are capable of breeding out in other than padi water.

Captain Williamson gives interesting details on the larvicidal powers of water insects, and rice fields fish. Particulars of the flora associated with mosquito larvae are also given. Experiments were conducted to ascertain the larvicidal powers of the minerals from local mines. Experiments to determine the larvicidal powers of small quantities of explosives were opposed by local authorities, and were inconclusive.

Rubber oil was proved to be an effective larvicide and its addition to solar and crude oils increase their power.

The food of larvae was also the subject of enquiry.

COMMENTS ON THE REPORT OF THE CHEMIST, INSTITUTE FOR MEDICAL RESEARCH.

57. The chemical laboratory carried out work for the Medical, Trades and Customs, Police, Public Works and Railway Departments.

During 1925, 6,021 samples were examined as against 7,368 in 1924.

Samples of milk, water, sewage effluent, toddy, etc., were examined for the Medical Department. It is noticeable that only one sample of anti-mosquito smudge stick showed the presence of arsenic out of several examined.

The preparation of Vitamin B. extract was continued and details of the process are given in the Laboratory Report.

COMMENTS ON THE REPORT OF THE MEDICAL SUPERINTENDENT, CENTRAL MENTAL HOSPITAL.

58. The number of patients increased during 1925 by 150. The total on December 31st being 1,451.

During the year the first Kelantan patients were admitted.

The admissions of patients from the Federated Malay States only decreased, 131 were admitted against 166 in 1924, and 150 in 1923. The total admissions from all places, sending cases to Tanjong Rambutan increased, however, 666 being the total admitted for 1925.

For statistical purposes the Federated Malay States patients only are dealt with.

Primary dementia account for the largest number of admissions. The Medical Superintendent draws attention as he did in the Annual Report for 1924 to this danger as young adults are affected and permanent attacks in later life are common. The report again draws attention to the dangers of over hasty education and the system of cramming immature brains for examinations.

There were 276 discharges in 1925 as against 232 in 1924. A large number of patients were discharged under bond, "not improved".

Recoveries number 177 against 201 in 1924 and the recovery rate is 31.88 against 37.99. The Medical Superintendent attributes the fall in the recovery rate to shortage of staff.

Incurable admissions are increasing in numbers, general paralysis of the insane, senile dementia, secondary dementia, imbecility, etc. The commonest causes of insanity are :

Gastro-intestinal disturbances	...	...	...	...	...	144
Syphilis	...	...	...	...	...	112
Cardiovascular Degeneration	...	...	...	...	...	88
Alcohol	...	...	...	...	...	71

The admissions due to alcoholism have increased by 33, as compared with 1924. The Medical Superintendent attributes this alarming increase to the Chinese adopting alcohol to replace opium greatly to their detriment, a remark that many will agree with. It is also noteworthy that alcohol appears to be a contributory cause in 50 per cent. of the admissions. Alcohol was the primary cause in 43 Chinese cases, and in only 20 Tamil cases. In the past these races used to reverse this order of things.

Death-rate.—There were 128 deaths with a death-rate of 5.31 per cent., the lowest death-rate on record for the Mental Hospital. The commonest causes of death were general paralysis of the insane 42, phthisis 19 and dysentery 16. The increase in general paralysis of the insane is unaccountable and very remarkable. The insane are especially prone to phthisis but the Tanjong Rambutan figures are extremely low and cause the Medical Superintendent to doubt whether the outcry about the alarming increase in phthisis has foundation in fact, and many of the best informed share his scepticism.

Suicides.—There was one case of suicide by hanging. The patient succeeded in hanging himself in spite of there being a special attendant in charge of him. This gives one some idea of the difficulties to be contended with owing to the untrustworthiness of the attendants.

Fatalities.—There were seven, five due to assaults by patients, and two as a result of falls. Abscondings numbered 83, but many voluntarily returned. This will always happen where freedom and treatment replace prison methods.

General.—A new female ward of forty beds was opened in 1925. The foundations of the new first class wards were dug before the end of the year.

There are twelve farms accommodating 250 patients. Large and valuable quantities of foodstuffs were produced by the farms and valuable work from the work-rooms.

Anti-malarial draining and oiling was carried out as usual during the year. There was a slight increase in the malarial incidence, possibly due to the heavy rains and to some of the drains having given way at the joints.

The maintenance rate was \$172 per head per annum as against \$174 for 1924 and \$176 for 1923. Amusements, cricket, football, circus and cinema performances were given to the patients from time to time, and the sports were as great a success as usual.

APPENDICES.

59. The following reports are attached as appendices :

- A.—Report of the Director of Government Laboratories.
- B.—Report of the Malaria Research Officer, Institute for Medical Research.
- C.—Report of the Chemist, Institute for Medical Research.
- D.—Report of the Senior Health Officer.
- E.—Report of the Registrar-General of Births and Deaths.
- F.—Report of the Chief Surgeon, Perak.
- G.—Report of the Chief Surgeon, Selangor.
- H.—Report of the Central Mental Hospital.
- I.—Report of the Specialist, Venereal Diseases.
- J.—Report of the Radiologist, Federated Malay States.
- K.—Report of the Medical Officer in Charge of Leper Asylum, Kuala Lumpur.

KUALA LUMPUR,
March, 1926.

R. DOWDEN,
Principal Medical Officer, F.M.S.

TABLE 1.

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1925.

Diseases.	Remaining in Hospital at the end of 1924.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1925.	Remarks.
		Admissions.	Deaths.			
Beri-beri	106	800	98	906	127	
Cerebro-spinal fever ... ..	...	10	7	10	2	
Chicken-pox	3	136	...	139	4	
Cholera ... ..	...	...	...	...	...
Dengue	1	17	...	18	1	
Dyphtheria	3	24	9	27	...	
Dysentery, amœbic	51	1,240	222	1,291	38	
„ bacillary	81	1,322	327	1,403	72	
Endocarditis—infective ... ..	...	...	...	...	...
Enteric	9	111	34	120	13	
Para typhoid ... ..	...	2	...	2	...	
Erysipelas	4	52	8	56	2	
Gonorrhœa	53	1,380	4	1,433	69	
Gonorrhœal rheumatism	5	47	...	52	1	
Influenza	84	4,437	44	4,521	123	
Kala azar ... ..	...	...	...	...	...
Leprosy (a) Nodular	88	162	20	250	66	
(b) Anæsthetic	473	377	37	850	590	
(c) Mixed infection	2	19	2	21	2	
Malaria (a) Tertian	127	5,795	162	5,922	131	
(b) Quartan	29	613	10	642	17	
(c) Æstive—autummal	260	10,850	585	11,110	288	
(d) Chronic malaria	92	3,812	160	3,904	154	
(e) Black-water ... ..	...	9	2	9	...	
(f) Mixed infection	6	643	63	649	18	
(g) Type undiagnosed	16	832	13	848	12	
Measles	1	339	3	340	27	
Malta fever ... ..	...	...	...	...	...
Plague... ..	...	...	...	...	...
Pneumonia	66	1,856	779	1,922	84	
Rabies... ..	...	1	1	1	...	
Pyrexia of uncertain origin	34	1,278	35	1,312	49	
Relapsing fever ... ..	...	...	...	...	...
Rheumatic fever	3	20	...	23	1	
Rheumatism	19	392	...	411	15	
Septicæmia	1	91	67	92	..	
Trypanosomiasis (sleeping fever) ... ..	...	...	...	...	...
Smallpox ... ..	...	1	...	1	...	
Syphilis (a) Primary	35	641	2	676	45	
(b) Secondary	67	882	23	949	50	
(c) Inherited	4	65	22	69	5	
(d) Tertian	48	369	38	417	31	
(e) Other syphilitic diseases	2	21	4	23	2	
Tetanus	1	68	55	69	...	
Tuberculosis	188	2,383	1,051	2,571	188	
Whooping cough ... ..	...	57	...	57	5	
Yaws	9	197	1	206	10	
Yellow fever ... ..	...	...	...	...	...
Other infectious diseases	11	247	17	258	10	
Intoxications {	Alcoholism	25	...	25	1	
	Morphinism	12	2	694	32	
	Others	13	...	13	1	
Anæmia	45	815	188	860	44	
Anæmia—pernicious ... ..	...	7	4	7	...	
Diabetes	1	78	12	79	6	
Exophthalmic goitre ... ..	...	...	...	...	...
Gout ... ..	...	1	...	1	...	
Leucocythæmia ... ..	...	...	...	...	...
Hodgkin's disease ... ..	...	1	...	1	...	
Myxœdema ... ..	...	...	...	...	...

TABLE 1—(cont.)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1925—(cont.)

Diseases.	Remaining in Hospital at the end of 1924.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1925.	Remarks.
		Admis- sions.	Deaths.			
Purpura ... ..	...	1	1	1	...	
Rickets	1	6	2	7	1	
Scurvy	9	22	14	31	...	
Other general diseases	101	1,037	258	1,138	100	
Neuritis	16	213	1	229	12	
Meningitis	3	36	27	39	...	
Myelitis	1	12	6	13	...	
LOCAL DISEASES.						
Diseases of the nervous system—						
Sub-section 1—						
Hydrocephalus ... ..	...	3	2	3	...	
Encephalitis ... ..	...	1	...	1	...	
Abscess of brain ... ..	...	3	3	3	...	
Congestion of brain ... ..	...	4	1	4	...	
Other diseases of brain... ..	6	77	36	83	2	
Sub-section 2—						
Apoplexy	1	23	14	24	1	
Paralysis	12	41	3	53	9	
Paraplegia	14	64	15	78	13	
Hemiphegia	26	148	24	174	33	
Epilepsy	6	90	7	96	5	
Neuralgia	3	148	...	151	3	
Hysteria ... ..	...	15	...	15	...	
Other nervous disorders	22	259	42	281	13	
Sub-section 3—						
Mental diseases—						
Idiocy ... ..	...	15	...	15	...	
Mania	1	123	...	124	1	
Melancholia	2	61	...	63	...	
Dementia ... ..	...	27	...	27	...	
Delusional insanity	1	74	...	75	1	
Other mental diseases	3	159	1	162	5	
Diseases of the eye—						
Conjunctivitis	13	470	1	483	15	
Keratitis	4	60	...	64	1	
Ulceration of cornea	18	181	4	199	8	
Iritis	14	61	1	75	5	
Optic neuritis	2	20	...	22	3	
Cataract	33	118	...	151	47	
Other eye diseases	118	477	5	595	128	
Diseases of the ear—						
Inflammation	1	73	1	74	...	
Other diseases	6	170	2	176	6	
Diseases of the nose	4	66	...	70	2	
Diseases of the circulatory system—						
Pericarditis ... ..	...	21	18	21	...	
Endocarditis ... ..	...	11	6	11	...	
Valvular Mitral	13	267	92	280	24	
Aortic	1	19	8	20	...	
Tricuspid ... ..	...	...	...	...	...
Pulmonary ... ..	...	1	1	1	...	
Arterial sclerosis	3	11	2	14	...	
Aneurism	1	22	4	23	2	
Other diseases of heart	5	193	77	198	13	

TABLE 1—(cont.)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1925—(cont.)

Diseases.	Remaining in Hospital at the end of 1924.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1925.	Remarks.
		Admis- sions.	Deaths.			
Diseases of the respiratory system—						
Laryngitis	1	26	1	27	1	
Bronchitis	122	3,052	77	3,174	132	
Broncho-pneumonia	23	619	237	642	40	
Abscess of lung ... ..	...	8	4	8	...	
Gangrene of lung	1	23	22	24	...	
Empyema	3	39	17	42	5	
Emphysema ... ..	...	9	1	9	1	
Pleurisy	6	221	15	227	12	
Other diseases of the respiratory system ...	53	1,028	40	1,081	29	
Diseases of the digestive system—						
Stomatitis	7	110	3	117	2	
Caries of teeth	1	80	1	81	...	
Glossitis ... ..	...	1	...	1	...	
Sore throat ... ..	...	52	...	52	1	
Inflammation of tonsils	1	117	...	118	2	
Gastritis	10	435	16	445	7	
Ulceration of the stomach	4	53	19	57	4	
Hæmatemesis ... ..	...	6	1	6	...	
Dilation of stomach ... ..	...	4	...	4	1	
Stricture of stomach ... ..	...	...	...	...	...
Dyspepsia	13	417	2	430	12	
Enteritis	16	402	46	418	32	
Appendicitis	3	103	8	106	3	
Colitis	3	70	...	73	5	
Ulceration of the intestines ... ..	...	17	9	17	...	
Sprue ... ..	...	46	13	46	3	
Hernia	11	213	14	224	10	
Diarrhœa	41	1,343	89	1,384	47	
Constipation	10	841	2	851	8	
Colic	4	281	...	285	3	
Hæmorrhoids	6	218	...	224	14	
Intestinal obstruction ... ..	...	39	16	39	...	
Hepatitis—acute	4	95	2	99	4	
Abscess	5	66	7	71	5	
Cirrhosis	24	332	166	356	25	
Jaundice	6	103	20	109	6	
Peritonitis	1	67	46	68	4	
Ascites	3	42	7	45	2	
Other diseases of the digestive system ...	25	664	83	689	22	
Diseases of the lymphatic system						
Splenitis	6	121	2	127	...	
Inflammation of lymphatic gland	10	137	1	147	12	
Suppuration of lymphatic gland	8	308	1	316	25	
Lymphangitis	1	60	...	61	4	
Elephantiasis ... ..	...	12	...	12	2	
Other diseases of the lymphatic system ...	19	321	2	340	15	
Diseases of the urinary system—						
Acute nephritis	22	523	166	545	31	
Bright's disease	28	274	98	302	20	
Pyelitis ... ..	...	11	...	11	...	
Renal colic... ..	...	6	...	6	...	
Cystitis	4	63	4	67	2	
Vesical calculus	2	31	1	33	5	
Suppression ... ..	...	5	3	5	...	
Hæmaturia ... ..	...	7	1	7	...	
Chyluria ... ..	...	...	...	...	...
Other diseases of the urinary system ...	4	167	21	171	9	

TABLE 1—(cont.)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1925—(cont.)

Diseases.	Remaining in Hospital at the end of 1924.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1925.	Remarks.
		Admis- sions.	Deaths.			
Diseases of the generative system—						
Male organs—						
Urethral fistula	1	29	...	30	2	
Phimosis	6	114	...	120	6	
Stricture	1	65	2	66	2	
Prostatitis	1	10	1	11	...	
Soft cancre	34	732	...	766	53	
Condyloma	2	8	...	10	1	
Inflammation of scrotum ... ..	...	16	...	16	1	
Hydrocele	3	55	...	58	1	
Orchitis	1	109	...	110	2	
Epididymitis	6	84	...	90	2	
Abscess of testicle ... ..	...	6	...	6	...	
Other diseases	18	311	5	329	20	
Female organs—						
Ovaritis ... ..	...	4	...	4	...	
Ovarian cyst ... ..	...	22	...	22	2	
Endometritis	1	13	...	14	...	
Displacement of uterus ... ..	...	13	1	13	...	
Vaginitis... ..	1	40	...	41	...	
Amenorrhœa ... ..	...	5	...	5	...	
Dysmenorrhœa ... ..	...	32	...	32	...	
Menorrhagia	1	20	...	21	...	
Leucorrhœa ... ..	...	40	...	40	...	
Abortion	1	174	11	175	3	
Delayed labour ... ..	...	60	10	60	...	
Post-partum hæmorrhage	1	5	3	6	...	
Retained placenta ... ..	...	19	3	19	1	
Premature birth ... ..	...	52	32	52	2	
Premature septicæmia ... ..	...	12	2	12	...	
Puerpural „	5	47	12	52	1	
Mastitis ... ..	...	13	...	13	2	
Abscess of breast	1	20	...	21	1	
Other diseases of female generative system	25	1,013	86	1,038	38	
Diseases of organs of locomotion—						
Osteitis	1	11	...	12	1	
Arthritis	25	391	10	416	36	
Spondylitis... ..	1	4	...	5	...	
Bursitis ... ..	...	5	...	5	...	
Other diseases	30	473	16	503	27	
Diseases of connective tissue—						
Cellulitis	47	547	43	594	38	
Abscess	87	1,726	30	1,813	80	
Elephantiasis	1	4	...	5	...	
Other diseases	28	264	19	292	9	
Diseases of the skin—						
Urticaria ... ..	...	44	...	44	1	
Eczema	16	491	...	507	16	
Boil	4	164	...	168	3	
Carbuncle	4	55	4	59	1	
Herpes	1	78	...	79	...	
Psoriasis	1	19	...	20	...	
Oriental sore	43	187	...	230	8	
Tinea	1	83	...	84	1	
Scabies	26	1,011	1	1,037	26	
Acne ... ..	...	4	...	4	...	
Prickly heat ... ..	...	1	...	1	...	
Other diseases of the skin	285	4,881	63	5,166	339	

TABLE 1—(cont.)

RETURN OF DISEASES AND DEATHS (IN-PATIENTS) FOR THE YEAR 1925—(cont.)

Diseases.	Remaining in Hospital at the end of 1924.	Yearly total.		Total cases treated.	Remaining in Hospital at the end of 1925.	Remarks.
		Admissions.	Deaths.			
Injuries—						
General	8	781	66	789	48	
Local	303	6,052	147	6,355	240	
Surgical operations, Major	776*					
" " Minor	5,722*					
Tumours	11	271	66	282	23	
Malformations	20	39	5	59	26	
Poisons	2	77	5	79	1	
Other diseases ... ..	...	32	1	32	...	
Parasites—						
Animal	1	13	...	14	...	
Protozoa ... ..	...	...	...	...	...
Trematoda (flukes) ... ..	...	1	...	1	...	
Cestoda ... ..	...	...	...	...	...
Tænia solium ... ..	...	6	...	6	1	
Tænia saginata ... ..	...	10	...	10	...	
Menatoda ... ..	...	...	...	...	...
Ascaris	75	2,602	18	2,677	61	
Tricocephalus dispar	1	2	...	3	...	
Trichina ... ..	...	...	...	...	...
Dracunculus ... ..	...	10	...	10	1	
Filariasis ... ..	...	9	...	9	1	
Strongylus ... ..	...	1	...	1	...	
Ankylostomiasis	151	3,158	190	3,309	104	
Oxyuris ... ..	...	...	...	...	...
Others	2	78	...	80	1	
Insecta ... ..	...	...	...	...	...
Myiasis ... ..	...	...	...	...	...
No discoverable diseases and under observation ...	187	5,908	3	6,095	258	
Anti-opium cases	99	3,640	2	3,739	123	
Dependents ... ..	...	36	...	36	1	
Normal labour	32	1,043	29	1,075	36	
Pregnancy	16	140	2	156	30	
Tropical typhus	1	24	2	25	3	
Total ...	4,634	98,932	6,964	103,566	5,040	

* Not included in total.

TABLE 2.

MEDICAL STAFF ON 31st DECEMBER, 1925.

- 1 Principal Medical Officer
- 4 Senior Medical Officers
- 2 Chief Surgeons
- 1 Ophthalmologist Surgeon
- 27 Medical Officers (5 acting as Health Officers)
- 7 Lady Medical Officers
- 1 Personal Assistant to the Principal Medical Officer
- 1 Financial Secretary
- 1 Deputy Medical Officer
- 21 Assistant Medical Officers
- 38 Assistant Surgeons
- 19 Dressers, Special Grade
- 68 Dressers, Grade I
- 234 Dressers, Grade II
- 92 Dressers, Grade III
- 79 Probationers
- 3 Matrons, Grade I
- 4 Matrons, Grade II
- 40 European Sisters
- 59 Asiatic Nurses
- 19 Native Midwives.

TABLE 2—(cont.)
 MEDICAL STAFF ON 31ST DECEMBER, 1925—(cont.).
 HEALTH BRANCH.

1 Senior Health Officer
 6 Health Officers
 2 Chief Sanitary Inspectors
 4 Assistant Surgeons
 5 Health Inspectors, Grade I
 23 Health Inspectors, Grade II
 1 Malaria Inspector.

INSTITUTE FOR MEDICAL RESEARCH.

1 Director
 1 Bacteriologist
 1 Pathologist
 1 Assistant Pathologist
 1 Chemist
 3 Assistant Chemists
 1 Malaria Research Officer
 1 Librarian
 1 Laboratory Assistant, Grade I
 4 Laboratory Assistants, Grade II
 5 Laboratory Assistants, Grade III
 4 Laboratory Assistants, Probationers.

CENTRAL MENTAL HOSPITAL.

1 Medical Superintendent
 1 Assistant Medical Superintendent
 1 Agricultural Officer
 1 Senior Assistant Physician
 1 Assistant Physician
 1 Second Assistant Physician
 1 Inspector
 1 Assistant Inspector
 1 Dresser, Grade II
 1 Dresser, Grade III
 2 Probationer Dressers
 1 Matron
 2 Nurses
 1 Work Mistress
 1 Steward
 1 Storekeeper.

VETERINARY BRANCH.

5 Veterinary Surgeons
 1 Assistant Veterinary Surgeon
 10 Veterinary Inspectors
 7 Veterinary Assistants

VENEREAL DISEASE BRANCH.

1 Venereal Disease Specialist
 1 Assistant Surgeon
 1 Nurse
 2 Dressers, Grade II (1 Dispenser)
 1 Dresser, Grade III (Laboratory)
 3 Attendants (1 female)

RADIOLOGICAL BRANCH.

1 Radiologist
 1 Dresser, Grade III.

ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR
THE YEAR 1925.

PASTEUR INSTITUTE.

Canine Rabies.—In August, 1924, a case of canine rabies, certified by a Medical Officer, had occurred in the State of Kedah, and a second canine case, which was found to be positive at this Institute, had been observed by the Government Veterinary Surgeon, Malacca. Further cases had not been reported from these areas and no other centres of infection were known to exist in Malaya.

The year 1925 therefore opened quietly and Pasteur treatment was given to one person only during the first two months. On the 12th of March however Dr. A. Neave Kingsbury was called in consultation on a young Indian student who had been admitted to the General Hospital, Kuala Lumpur. Hydrophobia was diagnosed, and a relative alleged that the patient had been bitten four months previously by a dog belonging to a travelling circus which had visited the town. The diagnosis was later confirmed by the finding of negri bodies and the Veterinary Department and the public were warned of the probable existence of rabies in Kuala Lumpur.

On the 16th of March two cases applied for Pasteur treatment after being bitten by a dog which proved to be rabid and which had been kept a few hundred yards from the site on which the circus had been showing. This was the first known canine case in the Selangor outbreak, during which seven dogs were found to be rabid by laboratory diagnosis and another was almost certainly rabid, but, owing to the number of illiterate Asiatic dog owners in the district, it is probable that all the cases did not come under observation. The measures adopted in dealing with this outbreak appear to have been successful for no case is known to have occurred in Selangor for the past three months.

In February, a Government official, whose quarters in Kuala Lumpur were near the site of the circus, had been posted to the State of Perak. The presence of rabies in Selangor was not then suspected and he had been permitted to take his dog with him. In the third week of March this animal showed signs of rabies. Negri bodies were present in the brain, but fortunately no further case has occurred in Perak during the year.

Siam borders the north of Malaya. Buddhism is there the national religion and as the destruction of animals is against Buddhist tenets, rabies has a firm hold in the country. The southern boundary of Siam presents little geographical obstacle to a wandering dog and in June, rabies occurred in Perlis, the most northerly of the Unfederated Malay States. To the south of Perlis is the Unfederated State of Kedah and in August, canine rabies was recognised in the latter State. This outbreak, which is of an extensive nature, may have been a sequel of the case which occurred there in August, 1924, but it appears more probable that infection spread southwards from Siam through Perlis.

In December a case of proved rabies was observed in Malacca. No case had been reported since October, 1924, but the disease has occurred at intervals in this Settlement for some years.

Pasteur Treatment.—During the present year the number of cases attending the institute increased to 123, of whom 64 were at risk. Had treatment not been available locally it would have been essential for these 64 persons to seek it elsewhere, with consequent delay, and increase in the chances of developing the disease. The local Pasteur Institute has therefore abundantly justified its establishment. In a similar series treated in one of the Institutes in India a mortality of one per cent. occurred in spite of treatment, so that the present record of no deaths among treated cases is very satisfactory.

It has been the practice to commence treatment immediately a patient reports from an area in which rabies is known to exist, should the bites be on the face or be deep or multiple, and later to discontinue if the Veterinary Officer reports that the dog is healthy 10 days after the attack. This procedure accounts for the relative large number of incomplete treatments shown in Table I. If the bites are of a superficial nature only, the patient is requested to return to the Institute on the eleventh day after the bite. In the meantime a report is obtained from the Veterinary Department and if the dog remains healthy the patient is discharged without treatment.

Table II is an analysis of the gravity of the risk to which the cases were exposed; those included in column V being bitten by untraced dogs in unprovoked attacks, from areas in which rabies was known to be existent.

Examinations for Negri Bodies.—Brains of 83 dogs of which 19 were found to be positive were submitted from the various States and Settlements. The number (45) for Selangor appears unduly high in relation to the number of positive cases (7), but the outbreak of rabies in the Kuala Lumpur district coincided with an extensive epidemic of nervous distemper.

Prophylactic Canine Vaccine.—The preparation of a vaccine for prophylactic purposes was commenced in 1924 and has been extended during the year under review. Between 600 and 700 dogs in the Kuala Lumpur area and nearly 100 dogs in Kedah have been inoculated. Major Symonds, the State Veterinary Surgeon, Selangor, considers that one-twelfth of the Kuala Lumpur canine population has been vaccinated and although the method has been extensively applied to contacts with rabid dogs, no case of rabies has occurred on the inoculated group. He has met with the following instance which appears to bear on the efficacy of vaccination. A case of rabies occurred in a kampong (village) where twenty other dogs were kept, eighteen of which were then vaccinated. A second case developed later in one of the non-vaccinated dogs.

The manufacture of canine vaccine occasioned a heavy demand for local rabbits and breeders began to take advantage of the situation by rapidly advancing the prices; but it was found possible to counter the movement by the employment of sheep for the preparation of the vaccine with a resulting small reduction in cost.

Fixed Virus.—The “C” strain which was obtained from the Pasteur Institute, Coonoor, is now in its 647th passage and “L” strain, a local strain obtained from the Pasteur Institute, Colombo, where it was originally “fixed” is now in its 287th passage.

The “C” strain usually renders rabbits moribund seven days after intracerebral inoculation and the “L” strain in six and a half days. One piebald rabbit has been encountered which appeared to have some natural immunity to fixed virus. It was first inoculated with the “C” strain and as it showed no symptoms within 14 days, the “L” strain was inoculated into the opposite cerebral hemisphere. The animal remained well for six months, after which it was sacrificed in another experiment.

Since the opening of the Institute it has been the practice to pool material from the “C” and “L” strains in the preparation of vaccine. It was thought that differences in various strains of rabies virus might exist and that a polyvalent vaccine might be more valuable than a monovalent one in prophylactic treatment. Recent researches in America have indicated that the rabies virus can, to some extent, be sub-divided into groups and have thus supplied some confirmation that a polyvalent vaccine is of enhanced value.

It remains to add that liaison with the various Veterinary Officers has been a very important factor in the successful working of the institute and that the close co-operation of Major S. L. Symonds, the State Veterinary Surgeon, Selangor, and of Mr. R. MacGregor, who acted as State Veterinary Surgeon, Kedah, during part of the year, has greatly facilitated the keeping of accurate records of cases.

Description of a Human Case of Hydrophobia.—An Indian student, aged 14 years, was admitted to the General Hospital, Kuala Lumpur, on the 9th of March, complaining of severe pain in, and slight swelling of the buttocks, and inability to walk without assistance. A few days previously he had slipped on a banana skin and had fallen heavily.

On admission the patient appeared apathetic. Speech was difficult, articulation indistinct, and the timbre markedly nasal. There was some difficulty in swallowing but small quantities of fluid could be taken. The patient was unable to sit up in bed and voluntary movement of the legs was very limited. Knee-jerks were sluggish; ankle clonus absent; no anæsthesia was detected; the pupils were equal and reacted to light, but priapism was noted. The tongue was furred, the temperature normal; the pulse 96 and irregular, and the urine contained no reducing substances. No ova were found in the fæces and blood films were negative for malarial parasites.

10th March, 1925.—Obstinate constipation was noted. There were intervals of delirium. The nasal twang was rather more noticeable. Evening temperature was 102°, and the pulse 130, feeble and irregular.

11th March, 1925.—The patient was very excited. Some hyperæsthesia was noted. A blood count gave the following result:

Erythrocytes	...	...	...	...	...	4,740,000 per c.mm.
Leucocytes	...	...	...	...	...	20,800 ,,
Differential leucocyte count:						
Polymorphonuclears	...	...	...	...	...	81 per cent.
Lymphocytes	...	...	...	...	...	16 ,,
Large Mononuclears	...	...	...	...	...	3 ,,
Evening temperature 98.2°, pulse 120.						

12th March, 1925.—Consultation with Drs. MacDonald and Ashby. Knee-jerks were absent, ankle clonus absent, but there was paræsthesia over the left leg and priapism was again noted. Generalised spasms of minor intensity were occurring and the patient was very excited. There was no hypersecretion of saliva, no myoidema and no eye symptoms. The cerebro-spinal fluid was under pressure. It contained 12 lymphocytes per c.mm. and the globulin content was increased. The urine now contained a trace of glucose. Two scars on the posterior aspect of the lower third of the left leg were noticed and it was alleged by a relative that the patient had been bitten four months previously by a dog belonging to a travelling circus. A diagnosis of hydrophobia was made. The evening temperature was 99.6 and pulse 128.

13th March, 1925.—Delirium and paralysis were increased. Breathing was costal only. Spasms were more frequent and glycosuria more marked. The mid-day temperature was 103·6° and the pulse 142. Death occurred at 1.50 p.m.

At autopsy congestion of the meningeal vessels, fauces, larynx, pharynx, pancreas, suprarenals, kidneys and gastric mucosa was noted and punctate haemorrhages are present over the pleurae, pericardium, endocardium and peritoneum. A few minute haemorrhages were also seen in the brain substance.

Numerous negri bodies were present in films and sections of the brain.

Saliva from the case was injected intramuscularly into a guinea-pig which was alive and well six months later.

Brain substance was injected intramuscularly into a guinea-pig which died 17 days later and negri bodies were found in the hippocampus major.

Cerebro-spinal fluid was well shaken to distribute the cells and inoculated intracerebrally into a rabbit which died of proved rabies 35 days later. One c.cm. was also inoculated intramuscularly into a guinea-pig which was alive and well after six months.

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TABLE I.

CASES GROUPED ACCORDING TO DOMICILES AND NATIONALITY.

		Nationality.	Selangor.	Perak.	N. Sembilan.	Singapore.	Penang.	Malacca.	Kedah.	Johore.	Perlis.	Total.
1924 (5 months)	Complete course of treatment	Europeans	2	...	1	8
		Eurasians ...	...	...	...	...	...	...	...	...	...
		Malays ...	...	...	...	...	...	...	2	...	...
		Chinese ...	...	...	...	...	...	...	...	...	...
		Indians ...	2	...	...	...	...	1	...	...	...
	Incomplete course of treatment	Europeans	
		Eurasians ...	...	...	...	...	...	...	...	...	...
		Malays ...	...	...	...	...	...	...	...	...	...
		Chinese ...	...	...	...	...	...	...	...	...	...
		Indians ...	...	...	...	...	...	...	...	...	...
	Advice only	Europeans ...	2	6
		Eurasians ...	...	...	...	...	...	...	...	...	...
		Malays ...	...	...	...	...	...	...	...	...	...
		Chinese ...	1	...	...	...	...	...	...	...	...
		Indians ...	3	...	...	...	...	...	...	...	...
	Total for 1924	8	2	1	3	14
1925 (12 months)	Complete course of treatment	Europeans ...	2	4	5	...	2	70
		Eurasians ...	2	...	...	1	...	...	...	...	...
		Malays ...	3	...	...	...	...	...	4	...	...
		Chinese ...	16	2	...	...	...	2	4	...	...
		Indians ...	14	1	1	...	...	1	5	...	1
	Incomplete course of treatment *	Europeans ...	5	...	1	19
		Eurasians ...	2	...	...	...	...	...	...	...	...
		Malays ...	1	...	...	...	...	...	...	...	...
		Chinese ...	2	...	...	...	...	...	...	...	...
		Indians ...	7	...	...	...	...	...	...	1	...
	Advice only	Europeans ...	3	34
		Eurasians ...	3	...	...	...	...	...	...	...	...
		Malays ...	3	...	...	...	...	...	...	...	...
		Chinese ...	6	...	...	...	...	...	...	...	...
		Indians ...	19	...	...	...	...	...	...	...	...
	Total for 1925	88	7	2	1	...	3	18	1	3	123

* Two cases only absconded. In the remaining 17, treatment was commenced on account of bites on the face or deep or multiple bites, and discontinued on a report from a Veterinary Surgeon that the dog showed no signs of rabies ten days after biting.

TABLE II.
SHOWING RESULTS OF TREATMENT IN 1925.

Position of bite.	I.	II.	III.	IV.	V.	VI.	Total treated.	Total deaths during or after treatment.
Face ... ..	...	...	...	...	...	...	...	...
Limbs and trunk naked	7	2	7	14	14	6	50	...
Limbs and trunk through clothing	6	1	3	...	10	...	20	...
Totals ...	13	3	10	14	24	6	70	...

- I. Cases bitten by animals proved rabid by laboratory examination.
- II. Cases bitten by animals certified rabid by Veterinary or Medical Officer. No laboratory tests.
- III. Cases bitten by animals almost certainly rabid according to history. No laboratory tests.
- IV. Cases which had recent abrasions contaminated with the saliva of proved rabid animals.
- V. Cases bitten by animals which were untraceable (unprovoked attacks).
- VI. Cases bitten by or having abrasions contaminated with saliva of animals on which laboratory tests were negative.

TABLE III.
EXAMINATIONS OF BRAINS FOR NEGRI BODIES, 1925.

				Selangor.	Perak.	N. Sembilan.	Singapore.	Penang.	Malacca.	Kedah.	Johore.	Perlis.	Total positive.	Total negative.	Grand total.
				+	-	+	-	+	-	+	-	+	-		
1924 (5 months) ... ..	...	...	...	2	...	...	4	...	2	1	1	...	1	9	10
1925 ... ..	...	...	...	7	45	1	1	...	2	1	3	9	9	...	83

MALARIA.

Treatment by Secondary Alkaloids of Cinchona.—Dr. Fletcher continued his studies of the value of the secondary alkaloids of cinchona in the treatment of malaria.

A supply of purified cinchonine was obtained through the courtesy of Dr. H. H. Dale, F.R.S., of the National Institute for Medical Research, Hampstead, and a number of clinical tests were carried out with it. It was found that in doses of 0.1 grain for each pound of body weight cinchonine is as effective as quinine; in doses of 0.1 grain per kilogram, cinchonine is less effective than quinine. Cinchonine is not more toxic than quinine.

The Government of the Federated Malay States is faced with two urgent problems : (1) The advisability of employing cinchona febrifuge to supplement quinine; (2) The policy of planting cinchona in Malaya.

Quinine is employed in the treatment of malaria, almost to the entire exclusion of the other alkaloids. In 1921, experiments made in Kuala Lumpur showed that quinidine is as effective as quinine; cinchonine and cinchonidine are of slightly less value. The amorphous alkaloids are poisonous. Cinchona febrifuge proved as effective as quinine when 10 grains were given twice a day. Quinine was isolated thirty-two years before the other alkaloids and it is the only alkaloid of cinchona included in the British Pharmacopoeia. The hardy, red bark, which will grow in many parts of the tropics, contains more of the other alkaloids than it contains quinine. The yellow bark, which flourishes far better in Java than anywhere else, contains a preponderance of quinine. There is no demand for the other alkaloids. Bark is priced by its quinine content and therefore it does not pay to cultivate cinchona outside of Java.

A mixture of the total alkaloids extracted from red bark by acidulated water was manufactured and used in India from 1874 onwards. It was called cinchona febrifuge. Owing to the demand for quinine, yellow bark hybrids were cultivated in place of red bark and the original composition of cinchona febrifuge was changed. The cost of quinine and the limited areas in which it can be successfully cultivated puts it beyond the reach of thousands. Colonel Gage recommends the cultivation of red bark and the manufacture of cinchona febrifuge to supplement the supply of quinine and relieve the situation. The disadvantages of cinchona febrifuge are its brown colour, the

variability of its composition and the quantity of poisonous amorphous alkaloids which it sometimes contains. These difficulties could be overcome by reverting to the original method of its manufacture by the cultivation of red bark. We suggest that the Government should attempt the cultivation of red bark for the purpose, and, that, for the present they should purchase the febrifuge in assayed bulk, put up in sealed one-pound tins of tablets. Quinine must be obtained from the countries where it can be produced most economically.

Comparative tests of quinine and febrifuge were made, on a large scale in the Government hospitals, during 1923. The febrifuge appeared to be slightly less satisfactory than quinine. Analysis showed that the composition of the febrifuge was not so good as the average composition given by the manufacturers.

We made comparative tests with a sample of this febrifuge and a purified specimen of quinine bisulphate. The average weight of the patients was about 100 lbs. In doses of five grains, twice a day, the quinine proved sufficient to clear the peripheral blood of asexual malaria parasites. The same dose of febrifuge was insufficient. When the febrifuge was given in doses of 10 grains, twice a day, the results were quite satisfactory. Doses of 20 grains, twice a day, were given to seven patients. This amount was too poisonous and caused vomiting and diarrhoea. Only one of the men could take these doses for more than two days. This effect was due to the large proportion of amorphous alkaloids in this sample of febrifuge.

The conclusion reached from these tests was the same as that of three years before—namely, that the sample of cinchona febrifuge was as efficient as quinine in doses of 10 grains twice a day.

Other Forms of Treatment.—The efficacy of peracrina 303 and of mercurochrome 220 in the treatment of malaria fevers have also been investigated during the past year.

A supply of peracrina was received from the manufacturers made up in pills of about 10 grains each. These were found to consist of a mass of yeast cells and a little starch, stained with a yellow dye. The makers state that four hundred pills are required for the treatment of an ordinary case of malaria and the cost of such a course in Singapore is equal to about two pounds sixteen shillings sterling. Relatively the preparation is thus much more expensive than quinine. Clinical tests by Dr. Fletcher did not show that peracrina had any effect on malaria parasites, which may increase in number during treatment. It was also found impracticable to administer the preparation over the long period and in the large doses recommended by the manufacturers.

Mercurochrome 220 soluble (the disodium salt of 2.7 dibrome-4-hydroxymercurifluorescein) was exhibited in a daily intravenous dose of 20 c.cms. of a 0.5 per cent. solution. Three injections were given to a case of benign tertian malaria, the temperature being controlled by aspirin. Three days later a typical rigor occurred with a temperature of 102.9°F. A malignant tertian case received a similar quantity of the drug and fever recurred two days after the last injection. Dr. Kingsbury found that the dye appeared to have little effect on the number of parasites in the peripheral blood and caused no modification in their staining properties. Severe stomatitis developed in both cases.

Tests in Diagnosis.—A series of experiments has been conducted by Dr. Kingsbury to determine the value of auxiliary laboratory tests in the diagnosis of malarial fevers. Serum bilirubin has been estimated by van den Bergh's test. Practically all uncomplicated cases gave an indirect reaction (haemolytic type of jaundice) and quantitative readings by the employment of the "indirect" technique indicated that 63 per cent. of quartan (8), 91 per cent. of benign tertian (45) and 99 per cent. of the malignant tertian cases (97) had 0.5 or more units of serum bilirubin. In 40 normal native controls the highest figure encountered was 0.4 units. The averages for the quartan benign tertian and malignant tertian cases were 0.74, 1.21, and 2.0 units, respectively, indicating that *P. falciparum* causes considerably more haemolysis than *P. vivax* and *P. vivax* than *P. malariae*.

The immediate effect of quinine administration by the intravenous route in *P. vivax* infections and by the intravenous or oral routes in *P. falciparum* infections is to increase the serum bilirubin by 0.5 to 1.0 unit during the first twenty-four hours. This is possibly explicable by the haemolysis of infected corpuscles. If quinine is continued a rapid fall in serum bilirubin ensues from the second day onwards.

Tests based on the excretion of urinary urobilin and urobilinogen were found to give more variable results than the van den Bergh reaction in malarial fevers.

Complement fixation has also received attention. Extracts of various organs obtained at autopsies on cases of acute malaria have been employed as antigens, but the most satisfactory one appears to be a suspension of heavily infected erythrocytes. By reducing the dose of complement to a minimum a number of positive reactions have been obtained in old standing benign and malignant tertian cases

and indeed it was occasionally possible to differentiate between these infections by the employment of a suspension of red cells infected with *P. vivax* and *P. falciparum* as separate antigens. But the results are insufficiently conclusive for the test to be of clinical value and the fact that up to 0.5 minimum haemolytic doses of complement may be absorbed when the antigen suspension and the serum under test are of different blood groupings, detracts from the usefulness of the reaction.

Precipitin and intra-cutaneous tests have also been attempted.

TROPICAL TYPHUS.

Dr. Fletcher and Mr. Lesslar continued their investigation of tropical typhus. The disease which we call tropical typhus is more common than at first we supposed it to be; in the Malay States it is probably as common as typhoid fever. Forty-eight cases of tropical typhus and eighty-seven of typhoid were diagnosed by laboratory tests during the year, but in typhus the temperature becomes normal on about the fourteenth day and, consequently, the patient's blood is not sent for examination as often as it is in cases of typhoid where the fever lasts longer.

During 1924 and the first half of 1925, the Weil-Felix reaction was carried out with a strain of *B. proteus* X. 19 which was brought from the Bland-Sutton Institute by Dr. A. N. Kingsbury two years ago, and which we call the "Kingsbury" strain on that account. It had been obtained by him from the Lister Institute in 1921 for use in the Weil-Felix test. In order to control the results given by this strain we procured a number of cultures of X. 19 from laboratories in different parts of the world—some from the National Collection of Type Cultures at the Lister Institute in London, some from Sumatra, some from India and some from Africa—and when we compared the Kingsbury strain with these cultures we found that it differed from them in many particulars. In the first place, the Kingsbury strain does not produce indol or ferment saccharose, it belongs to the an-indologenes group of van Loghem. The other strains form indol in peptone water and ferment saccharose, they belong to van Loghem's indologenes group. Secondly, the Kingsbury strain is distinguished from the others by its serological reactions, as we found by agglutination and absorption tests carried with immune sera prepared with the several cultures.

The question then arose whether the stock strains of X. 19 from the Lister Institute and elsewhere would be agglutinated, like the Kingsbury strain, in cases of tropical typhus. The test was made in several typical cases, where the Kingsbury culture was agglutinated to high titre and once more it was found to behave differently from the indologenic strains, for the latter were not agglutinated, even by low dilutions of the patients' sera, and it appeared that only the Kingsbury culture was agglutinated in cases of tropical typhus. This, however, did not prove to be the case. From the beginning of July, 1925, until the end of the year all sera sent to the laboratory for agglutination tests were examined with one of the indologenic strains of X. 19 from the National Collection ("Warsaw" or No. 67) as well as with the an-indologenic strain "Kingsbury", and it soon became apparent that, in addition to cases which agglutinate the Kingsbury culture, there are others which agglutinate the indologenic strains. During the latter half of the year we met with eleven cases of tropical typhus which agglutinated these indologenic strains; one agglutinated them at a titre of 1 in 500, four at titres between 1,000 and 2,000, five between 2,000 and 5,000, one at a dilution of more than 30,000. The agglutinations appeared at the end of the second week of illness, increased to a maximum in the fourth week and then declined slowly. The blood of the patients which agglutinated the indologenic strains did not agglutinate the Kingsbury strain.

Thus it became clear that there are two groups of cases; those in one group give a positive agglutination reaction with the Kingsbury strain but not with the indologenic strains; the other group, on the contrary, gives a positive agglutination with the indologenic strains but not with the an-indologenic culture "Kingsbury". It is convenient to have names by which to distinguish the two groups and we refer to the group which agglutinates the Kingsbury strain as "Group K"; and the other which agglutinates the Lister Institute strain, Warsaw and No. 67, and we call "Group W". There is probably an etiological difference between the groups; because, in the outbreak at a military camp which was reported last year, all the cases belonged to one group, the K group.

The cases in the two groups differ but little from one another in their course and in their clinical symptoms. The temperature has declined more often by lysis in the few cases of the W group which we have seen, than it usually does in the K group, and in some instances this decline has been followed by an irregular temperature and slow convalescence. In both groups it often happens that the agglutination reaction does not appear until the beginning of the third week, when the temperature has fallen and the patient is convalescent.

In order to determine if the K group cases would agglutinate other an-indologenic strains as well as the strain "Kingsbury" we obtained cultures of van Loghem's *B. proteus an-indolgenes* (No. 59, Elders and No. 60, Pneumo) from the National Collection, through the kindness of Dr. R. St. John-Brookes, and also a dozen strains isolated from the faeces of cholera patients. These were tested with the serum of several patients whose blood agglutinated the Kingsbury strain in high dilutions, but with none of them was a positive result obtained; the Kingsbury culture appears to be specific in this respect and we have not been able to find any other strain which can be employed in its place.

There were three fatal cases during the year; two among the thirty-seven patients in the K group and one among the eleven in the W group. These three patients were all Tamils and they all died at Kuala Lipis, the capital of Pahang. We were not able to visit them ourselves and no post-mortem examinations were made. Two of them died with pulmonary consolidation, one on the fifteenth and the other on the twenty-second day of illness. The third patient died on the thirty-first day with symptoms of meningitis.

Thirteen of the forty-eight patients were Punjabis, cattle-keepers or bullock-cart drivers. This is not such a high proportion as in the previous year, but it is a large number, considering Punjabis form so small a part of the population. The rest comprised four Europeans, two Malays, one Chinese and twenty-eight Tamils; most of the last being coolies on rubber estates.

Twenty-three of the cases occurred in the State of Selangor, eleven in Perak, seven in Negri Sembilan and seven (three of which were fatal) in Pahang. Though the disease is not infectious, in the sense that it spreads directly from man to man, it has a patchy distribution and preponderates in certain districts. Last year, nearly half the cases came from the village of Sungei Besi; this year, thirteen of the twenty-three cases which occurred in the State of Selangor were patients in the small outstation hospital of Kajang.

There did not appear to be any connexion between one case and another; there was no evidence of transmission by lice and the patients were nursed in the general wards of the Government hospitals without harm to anyone.

No facts were elicited which strengthened the hypothesis of conveyance by ticks. None of the patients who were questioned had ever been bitten by them as far as he was aware. One of the Europeans told us that he had been bitten on the foot by a bug ten days before his illness began and when he returned to his house, on leaving hospital, he found a number of bugs (*C. rotundatus*) on his mattress. Such a thing is not very uncommon; bugs are frequently found in the servants' quarters which are attached to the houses of Europeans. Another way in which these insects may be introduced is by the agency of Punjabi watchmen who are employed as caretakers of empty houses. These men take their beds with them; the beds consist of a wooden frame with ropes stretched across, and they often harbour bugs.

The first step towards elucidating the etiology of tropical typhus is the transmission of the disease to animals. We have not succeeded, so far, in conveying the infection to guinea-pigs; either because they are insusceptible or because we have not obtained the patients' blood at a stage when it contains an abundance of virus.

To sum up, the typhus-like fever which we call tropical typhus is as common in the Malay States as typhoid fever. The disease occurs in two forms, which are distinguished from one another by their agglutination reactions with *B. proteus* X. 19. In one form, group K, the blood agglutinates the an-indologenic strain "Kingsbury"; in the other group W, it agglutinates the indologenic strains such as "Warsaw" and No. 67, from the National Collection of Type Cultures.

DYSENTERY.

Dr. MacConkey of the Lister Institute was kind enough to prepare and supply a batch of concentrated dysentery serum incorporating local strains of *B. dysenteriae* (Flexner) which had been sent home by Dr. Fletcher. Alternate *B. dysenteriae* (Flexner) infections admitted to the District Hospital, Kuala Lumpur, were treated with sodium sulphate only, and with this serum in addition to the sodium sulphate. Three cases in the serum series were given the equivalent of 200 c.cms. and to the remaining 13 cases the equivalent of 100 c.cms. was administered. The serum was found to agglutinate the Flexner strains isolated from the cases in dilutions varying from 1/400 to 1/1600. One death occurred in both series, but the average time from admission to hospital to the disappearance of mucus from the stools was reduced from 14.4 days in the saline series to 10.8 days in the saline plus serum series.

Dr. Kingsbury found that bacteriologically and cytologically there was little difference between the groups, except that in 5 of the 16 serum cases transient negative results were obtained from stool cultures for a few days after administration.

Serum thus had some influence on the course of the disease, but the results accorded with those previously obtained by Fletcher (1924) who found that the effect of serum on this disease in the Asiatic patient was so slightly beneficial that the expenditure, which would be entailed by routine serum treatment, was not warranted.

Stovarsol (acetyl oxyaminophenylarsinic acid 190) has been employed in the treatment of a series of amoebic dysentery cases in doses of 0.25 grammes, twice daily. In four of the 13 stovarsol cases it was found necessary to revert to emetine treatment. Three of these cases died and healing of the amoebic ulceration was noted post-mortem. A fourth case in this series also died after 9 days stovarsol treatment. No evidence of healing of the ulcers was found at autopsy and the ulceration involved not only rectum and caecum but also the last four inches of the ileum. In the control emetine series, there was only one death. Amoebae and cysts did not disappear from the stools with the rapidity recorded by some workers, and stovarsol appears to be inferior to emetine for the treatment of acute amoebiasis, although it is a useful drug in the more chronic cases.

BERI-BERI.

A series of experiments has been carried out by Dr. Kingsbury on the relative value of rice polishings extract and commercial yeast extract, as sources of vitamin B. Although the work is not yet completed it is possible to state that rice polishings were found to have a higher relative value than is indicated by the work of Chick and Hume.

Details of the method employed in extraction of the vitamin from the rice polishings are included in another section of this report (Chemical Laboratory) and the following results indicate that this process of extraction is highly efficient.

To a group of four fowls, 2 c.cms. of rice polishings extract, per 1,400 grammes weight, was given daily in addition to a ration of autoclaved polished rice. All the birds showed a progressive loss in weight. One died of filariasis during the first month and in the other three polyneuritis gallinarum developed in 37, 42 and 45 days respectively.

A second group had 2.5 c.cms. of rice polishings extract per 1,400 grammes weight, in addition to a daily ration of autoclaved polished rice. The average weight remained constant and none of the birds developed polyneuritis although the experiment was continued for 12 weeks.

From 5 grammes of polishings, 2.5 c.cms. of extract is prepared. Fraser and Stanton, when working on the etiology of beri-beri, found that 3.5 grammes of polishings per kilogram weight was sufficient to keep in health fowls which were on a diet of polished rice. This quantity is relatively equal to 4.9 grammes of polishings per 1,400 grammes weight. No experiments have been carried out with the polishing supplied by the mills during recent years, but there is no reason to suppose that variation should occur. It therefore appears that the extract from 5.0 grammes of polishings is as potent in vitamin content as 4.9 grammes of the polishings themselves.

COLLOIDAL GOLD AND MASTIC TESTS.

A series of colloidal gold, mastic and Wassermann reactions have been carried out on cerebro-spinal fluids from patients in the mental and other hospitals. The parietic type of curve has been obtained in the colloidal gold test on nine Chinese, two Malays and one Indian. This is regarded as definite evidence that general paralysis of the insane occurs among these races. The cerebro-spinal fluids from Tanjong Rambutan Mental Hospital were forwarded by the courtesy of Dr. Wilson.

MEASLES.

A somewhat serious outbreak of measles on rubber estates was successfully countered by the prophylactic use of serum from convalescent cases on a number of estates. The dosage of serum varied from 2.0 c.cms. to 4.0 c.cms. in different areas. Dr. Kingsbury personally visited the estates, collected the blood and administered the serum. Only a very small percentage of inoculated children developed measles and a striking feature was the mildness of the disease in these cases.

SMALLPOX VACCINE.

The yield of lymph from the calf in the tropics is notoriously low compared with the quantity obtainable in temperate climates. On this account it was decided to commence experiments on the preparation of vaccine by the passage of the virus through rabbits testicles (Noguchi, 1916). After passage to enhance the virulence, it is intended to carry out experiments on the relative efficiency, keeping properties and cost of this vaccine compared with calf lymph prepared in the usual manner.

MORBID HISTOLOGY.

Sections of 277 specimens were cut and examined during the year and following the practice commenced last year details of the benign and malignant tumour cases are given in the following tables.

One case only calls for special comment (Table II, Case No. 74). This man was a dresser in the hospital on a rubber estate and some years previously had injured his right index finger. When he came under observation he had an epithelioma on the right index finger and two epitheliomatous scrotal tumours. Attention has been directed to the frequency of scrotal cancer among soot, pitch and oil workers, and its rarity in other occupations. It is therefore of interest that this patient had carried out anti-malarial oiling on the estate for three years prior to the appearance of the tumours.

TABLE I.
BENIGN TUMOURS.

Case No.	Nationality.	Sex.	Age.	Position of tumour.	Diagnosis.
1	European ...	M.	35	Under surface of tongue ...	Papilloma
2	Eurasian ...	F.	41	Rt. ovary uterus ...	Dermoid fibromyomata
3	Malay ...	F.	25	Uterus ...	Fibromyomata
4	" ...	M.	28	Periosteum of fibula...	Fibroma
5	" ...	M.	32	Left knee' ...	"
6	" ...	F.	40	Uterus ...	Fibromyomata
7	Chinese ...	F.	$\frac{1}{4}$	Conjunctivo ...	Dermoid cyst
8	" ...	M.	12	Gluteal region (subcutaneous)	Fibroma
9	" ...	M.	18	Lower lip ...	Angioma
10	" ...	F.	42	Anterior abdominal wall (subcutaneous) ...	Fibroma
11	" ...	M.	50	Gluteal region ...	Dermoid cyst
12	Tamil ...	M.	15	Nasopharynx ...	Nasal polyp
13	" ...	M.	18	Both breasts ...	Fibroadenomata
14	" ...	M.	19	Forehead ...	Adenoma of sebaceous glands
15	" ...	M.	27	External auditory meatus ...	Papilloma
16	" ...	M.	27	Right breast ...	Fibroadenoma
17	" ...	M.	30	Anal margin ...	Papilloma
18	" ...	F.	35	Alveolar margin ...	Epulis
19	" ...	F.	35	Uterus ...	Fibromyomata
20	" ...	M.	35	Rt. shoulder (subcutaneous)	Lipoma
21	" ...	M.	40	Dorsum of left foot (subcutaneous) ...	Fibroma
22	" ...	M.	45	Dorsum of thorax ...	Adenoma of sebaceous glands
23	" ...	F.	45	Right ovary ...	Papillomatous cyst
24	" ...	F.	...	Vulva ...	Fibroma

TABLE II.
MALIGNANT TUMOURS.

Case No.	Nationality.	Sex.	Age.	Position of tumour.	Diagnosis.
1	Malay ...	F.	45	Left breast ...	Carcinoma
2	" ...	M.	50	Left leg ...	Epithelioma
3	" ...	M.	54	Glands penis ...	"
4	" ...	M.	55	Cervical glands ...	Secondary epitheliomatous deposits
5	" ...	M.	70	Scalp ...	Epithelioma
6	" ...	M.	74	Right orbit ...	"
7	Chinese ...	F.	2	Vulva and vagina ...	Mixed cell sarcoma
8	" ...	F.	7	Ovaries, kidneys, etc. ...	Round cell sarcoma
9	" ...	M.	16	Upper abdomen ...	Spheroidal cell carcinoma
10	" ...	M.	29	Mesentry ...	Colloid carcinoma
11	" ...	M.	29	Suprarenal and pancreas...	Round cell sarcoma
12	" ...	M.	30	Right cerebrum ...	Endothelioma
13	" ...	M.	30	Right side of tongue and submaxillary glands ...	Epithelioma
14	" ...	M.	31	Penis ...	"
15	" ...	M.	33	Ischio-rectal fossa ...	"
16	" ...	M.	34	Anal canal ...	"
17	" ...	M.	35	Pyloric region of stomach	Spheroidal cell carcinoma
18	" ...	M.	36	Nostril ...	Adeno-carcinoma
19	" ...	M.	36	Interscapular region ...	Epithelioma
20	" ...	M.	39	Liver, right clavical and 6th dorsal vertebral ...	Adeno-carcinoma
21	" ...	M.	40	Liver ...	Primary carcinoma

TABLE II—(cont.)
MALIGNANT TUMOURS—(cont.)

Case No.	Nationality.	Sex.	Age.	Position of tumour.	Diagnosis.
22	Chinese	M.	40	Liver	Primary carcinoma
23	"	M.	40	Cervical glands	Secondary epitheliomatous deposits
24	"	M.	40	Stomach and liver	Adeno-carcinoma
25	"	M.	41	Left half of abdomen extending to pelvis	Hypernephroma
26	"	M.	41	Cervical glands and liver... ..	Secondary epitheliomatous deposits
27	"	M.	42	Lung and mediastinal glands	Endothelioma
28	"	M.	42	Glands penis	Epithelioma
29	"	M.	42	Greater curvature of stomach	Adeno-carcinoma
30	"	M.	43	Kidney	Carcinoma
31	"	F.	43	Cervix uteri	Epithelioma
32	"	F.	44	" "	"
33	"	M.	44	Liver	Secondary carcibomatous deposit
34	"	M.	45	Pituitary fossa and sphenoid	Carcinoma
35	"	M.	49	Behind right ear	Dermoid cyst with malignant changes
36	"	M.	49	Retrocaecal	Round cell sarcoma
37	"	M.	50	Lung and liver	Endothelioma
38	"	M.	50	Tongue and epiglottis	Epithelioma
39	"	M.	50	Bridge of nose	"
40	"	M.	51	Left leg	"
41	"	M.	52	Lesser curvature of stomach	Adeno-carcinoma
42	"	F.	53	Cervix uteri	Epithelioma
43	"	M.	55	Gall bladder and liver	Carcinoma
44	"	M.	56	Liver	Secondary carcinomatous deposits
45	"	M.	58	Scalp	Epithelioma
46	"	M.	60	Pituitary, meninges and sphenoid	Carcinoma
47	"	M.	60	Liver and left femur	Secondary adeno-carcinoma
48	"	M.	65	Perineum	Epithelioma
49	Tamil	M.	12	Ileum	Small round cell sarcoma
50	"	M.	20	Retro-peritoneal	Large round celled sarcoma
51	"	F.	22	Breast	Sarcoma
52	"	M.	25	Penis	Epithelioma
53	"	F.	25	Lower lip	"
54	"	M.	27	Rectum	Carcinoma
55	"	M.	27	Penis	Epithelioma
56	"	M.	27	Angle of jaw	"
57	"	F.	28	Right cheek (buccal surface)	"
58	"	F.	30	Uterus, liver and pancreas	Chorion epithelioma
59	"	M.	30	Glands penis	Epithelioma
60	"	M.	30	" "	"
61	"	M.	30	Left cheek (buccal surface)	"
62	"	F.	30	Lips and tongue	"
63	"	M.	35	Left cheek (buccal surface)	"
64	"	M.	35	Angle of mouth	"
65	"	M.	35	" "	"
66	"	M.	35	Lower jaw	Epulis
67	"	M.	35	Pelvis	Colloid cancer
68	"	M.	35	Liver	Secondary carcinomatous deposits
69	"	F.	38	Vulva	Round celled sarcoma
70	"	M.	40	Caecum and ascending Colon	Sarcoma
71	"	F.	40	Left breast	Carcinoma
72	"	M.	40	Liver	Secondary carcinomatous deposits
73	"	M.	40	Back	Epithelioma
74	"	M.	44	Right index finger and scrotum	"
75	"	M.	45	Right cheek	"
76	"	M.	45	Floor of mouth	Carcinoma
77	"	F.	50	Uterus and right lung	Mixed celled sarcoma
78	"	F.	50	Lower jaw	Epithelioma

MELIOIDOSIS.

In previous reports this disease has been described as occurring in three centres of population—Rangoon, Kuala Lumpur and Singapore. All the patients were native of India except one European.

During 1925 the disease was recorded from another place, Tampin, again in a native of India. It was also met with for the first time in a Chinese.

A further case was identified in Saigon, French Indo-China, by Dr. F. H. Guérin, Director of the Pasteur Institute there. We are indebted to Dr. Guérin for cultures of the organism isolated by him and which has proved to be identical with *B. whitmori*.

It appears from these observations that the disease has a wide distribution and that only the difficulty in diagnosis prevents more frequent recognition of it.

Because of the close resemblance between the lesions of melioidosis and those of glanders many attempts have been made to infect horses with *B. whitmori*. These experiments were unsuccessful and horses have hitherto been considered immune. During this year however, a case of natural infection was met with in a race horse which six months earlier had been imported from Australia.

LEPTOSPIROSIS.

The existence of Weil's disease or spirochaetosis icterohaemorrhagiae has been long suspected in the Malay States; serious cases of jaundice, and of intestinal haemorrhage, have occurred from time to time, but, until the present year, the diagnosis has not been placed beyond doubt by the discovery of the infecting organism.

The first case to be met with was a Punjabi bullock-cart driver, a patient in the Malay Hospital at Kuala Lumpur who had been taken ill suddenly with shivering, vomiting and intense pain in the head. He was admitted to hospital three days later with a temperature of 104.4° and Dr. Fletcher saw him for the first time on the fifth day of his illness. The most striking features were great tenderness of all the muscles, severe headache and red injected eyes. The spleen was palpable, the glands were enlarged in the groin and there was an indefinite rash on the back, consisting of faint macules and rose spots. We collected a sample of blood and injected it into two guinea-pigs. The patient's temperature fell to 98.2 on the 6th day, but there was a secondary rise on the two following days before it became permanently normal on the ninth. The man had no jaundice at any time.

One of the two guinea-pigs died seven days after inoculation, with intense jaundice, haemorrhages and all the classical signs of leptospiral infection; the other guinea-pig was killed because it was very jaundiced and moribund. Large numbers of leptospirae were found in the livers and kidneys of both animals. Other guinea-pigs were inoculated with emulsions of these organs and the strain was carried on by passage through more than a hundred animals. It became very virulent; leptospirae were usually found in the blood on the fourth day after inoculation and the guinea-pigs died on the sixth day. This strain was cultivated in a rabbit's blood medium, in which it multiplies freely.

No leptospirae were found in the patient's blood during convalescence, but a specimen collected on the twentieth day after the commencement of his illness, and injected into a guinea-pig, produced an infection. The animal recovered and was subsequently immune to injections of large doses of virulent leptospirae.

The second case of leptospiral infection was also a Punjabi, a constable in the Railway police. His symptoms were very like those of the first patient and resembled dengue or influenza. The onset was sudden, with rigors, vomiting and severe headache. When this man was first seen, on the fifth day of his illness, he was suffering from great prostration, his eyes were very red and there was a blotchy erythematous rash over his back. His temperature came down to normal on the seventh day and this fall was followed by a secondary rise for a couple of days, similar to that which occurred in the first case. There was no jaundice. Blood drawn on the fifth day was inoculated into a guinea-pig with the result that it developed jaundice and died; leptospirae were found in its blood, kidney and liver and were cultivated in the usual media.

The third patient, also a Punjabi policeman, was not so severely ill as the first two, his temperature was never as high as 103°, it fell to 99° on the sixth day and became normal on the seventh; there was no secondary rise as in the other two cases. This man's illness resembled an ordinary, mild attack of dengue fever. There was no jaundice. A guinea-pig, inoculated with the patient's blood, on the third day of illness, died from leptospirosis ten days later and the organisms were maintained by animal passage and by culture.

The fourth case was a Punjabi watchman who was admitted to the Malay Hospital in Kuala Lumpur, on the seventh day of his illness, with fever, headache, and bronchitis. His temperature came down to normal on about the fourteenth day and we saw him for the first time about three days later. He then complained of pains in all the joints and his eyes were much infected. On account of the remarkable redness of his eyes we examined his urine for leptospirae; we found none, but a guinea-pig inoculated with it became infected. It recovered and was subsequently immune to infections with virulent leptospirae.

We have seen a number of patients with similar symptoms but we have not included them in this note because we were not successful in conveying the infection to animals.

Leptospirosis is probably a common disease in the Malay States and many cases of illness now diagnosed as dengue fever or influenza are probably the result of infection with leptospirae.

The three strains, which we have isolated, apparently belong to the same species because cross-immunization shows that they protect against one another.

DIPHTHERIA.

It is the opinion of the most medical men, with experience of local conditions, that diphtheria, in this country, is comparatively uncommon and comparatively mild. A special enquiry has been made into the susceptibility of children attending schools in Kuala Lumpur, by means of the Shick test, and a bacteriological examination of their throats has been carried out in order to discover if there are many carriers among them. In addition, all the strains of the diphtheria bacillus which have been isolated, recently, have been tested for virulence by the inoculation of guinea-pigs.

Contrary to expectation, the children proved to be quite as immune as the children in the large towns of Europe and America. Judging from the comparatively small number examined, the carrier-rate is approximately the same, moreover, the investigation of the strains of bacilli isolated from cases of diphtheria showed that they were not less virulent than the diphtheria bacilli of other countries.

ROUTINE EXAMINATIONS.

VENEREAL DISEASES.—

[illegible]

ENTERIC FEVERS.—

Positive	for	<i>B. typhosus</i>	...	...	...	...	199	...	302
"	"	<i>B. paratyphosus A.</i>	...	...	...	...	—	...	3
"	"	<i>B. paratyphosus B.</i>	...	...	...	...	10	...	17
Negative		...	...	...	...	...	467	...	814

CEREBRO-SPINAL FEVER.—

Positive	for	<i>Meningococcus</i>	...	...	...	...	7	...	9
„	„	<i>Pneumococcus</i>	...	...	...	...	9	...	12
„	„	<i>B. influenzae</i>	...	...	...	...	1	...	1
„	„	<i>B. tuberculosis</i>	...	...	...	...	3	...	—
„	„	<i>Staphylococcus</i>	...	...	...	...	1	...	—
Negative		... ..	...	...	...	...	26	...	39

CHOLERA.—

[illegible]

PLAGUE.—

[illegible]

DIPHTHERIA.—

[illegible]

LEPROSY.—

[illegible]

BACTERIOLOGICAL EXAMINATION OF FAECES.—							1924.	1925.
Positive for	<i>B. dysenteriae</i> ,	Flexner	...	...	...	...	75	106
„	„	<i>B. dysenteriae</i> ,	Shiga	...	...	...	2	—
„	„	<i>B. typhosus</i>	...	...	...	...	3	40
„	„	<i>B. paratyphosus</i>	A.	...	...	...	1	4
„	„	<i>B. paratyphosus</i>	B.	...	...	...	—	2
„	„	<i>E. histolytica</i>	...	...	...	...	18	91
„	„	<i>B. tuberculosis</i>	...	...	...	...	—	2
Negative	...	...	...	...	...	...	166	447
BACTERIOLOGICAL EXAMINATION OF URINE.—								
Positive for	<i>B. typhosus</i>	...	...	...	...	...	—	10
Negative	...	...	...	...	...	...	—	214
MISCELLANEOUS EXAMINATIONS	...	...	...	...	...	...	5,843	6,704

CHEMICAL LABORATORIES AND MALARIA BUREAU.

Reports on the work of the Chemical Laboratories by Mr. R. W. Blair, Chemist-in-Charge, and on the work of the Malaria Bureau by Captain K. B. Williamson, Malaria Research, are appended.

PUBLICATIONS.

The following publications were issued from the Institute during the year:

(a) *Bulletins from the Institute for Medical Research, 1925:*

- No. 1. "Rabies and Pasteur Treatment," by A. Neave Kingsbury. "Rabies in the Lower Animals," by S. L. Symonds. "Notes on the Laboratory Diagnosis of Rabies," by A. Neave Kingsbury.
 No. 2. "Tropical Typhus in the Federated Malay States," by W. Fletcher and J. E. Lesslar.
 No. 3. "Further Notes on the Treatment of Malaria with Cinchona Febrifuge, Quinidine and Cinchonine," by W. Fletcher.

(b) *Malaria Bureau Reports:*

- Vol. III. "How Oil Kills Anopheline Larvae," by H. P. Hacker.

(c) *Other Papers:*

- "Meliodosis," by A. T. Stanton and W. Fletcher. *The Lancet*, January 3rd.
 "On the alleged Deterioration of Insulin in the Tropics," by A. Neave Kingsbury. *The Lancet*, January 3rd.
 "A Case of Typhoid Septicaemia without Typhoid Ulcers," by W. Fletcher and J. E. Lesslar. *The Indian Medical Gazette*, January.
 "On the Technique and Significance of the Rosindole Reaction, applied to Urine," by A. Neave Kingsbury and K. Kanagarayer. *The Indian Medical Gazette*, April.
 "Meliodosis and its relation to Glanders," by A. T. Stanton and W. Fletcher. *The Journal of Hygiene*, April 25th.
 "On the Occurrence of *Piroplasma (Babesia) canis* in Malaya," by A. Neave Kingsbury. *Parasitology*, May 18th.
 "Mercurochrome 220 in the Treatment of Malaria," by A. Neave Kingsbury and K. Kanagarayer. *The Indian Medical Gazette*, August.
 "The Treatment of Malaria with Peracrina 303," by W. Fletcher. *The Indian Medical Gazette*, November.

STAFF CHANGES.

Mr. J. Shelton, Assistant Chemist, returned from leave on March 1st.

Dr. A. T. Stanton, Director of Government Laboratories, Federated Malay States, was absent on leave from March 14th to November 5th.

Dr. W. Fletcher acted as Director of Government Laboratories from 14th March to 13th September and Dr. A. N. Kingsbury from 14th September to 5th November.

Mr. H. Marsden, Assistant Chemist, was absent on leave from March 14th to November 17th.

Mr. J. E. Lesslar was appointed Assistant Pathologist, with effect from January 1st, 1923.

Dr. H. P. Hacker, Malaria Research Officer, retired on pension on 22nd August.

Dr. A. N. Kingsbury, Pathologist, was appointed Professor of Bacteriology, King Edward VII College of Medicine, Singapore, on November 11th.

Dr. F. E. Byron was appointed Assistant Chemist and assumed duty on 17th November.

INSTITUTE FOR MEDICAL RESEARCH,
 KUALA LUMPUR,
 January 31st, 1926.

A. T. STANTON,
 Director of Government Laboratories,
 Federated Malay States.

ANNUAL REPORT OF THE MALARIA BUREAU, INSTITUTE FOR MEDICAL
RESEARCH, FEDERATED MALAY STATES, FOR THE YEAR 1925.

STAFF.

Dr. H. P. Hacker, the Senior Malaria Research Officer, continued on leave until his retirement on 22nd August last. Dr. Wellington, the Senior Health Officer, acted as Malaria Research Officer, being in charge of the Bureau from 1st May to 13th September, and Dr. Cosgrave, Acting Senior Health Officer, was in charge from 14th September to November 20th. In the intervening periods, viz., from 1st January to 30th April, and from 21st November to December 31st, I was officially in charge of the Bureau; and remained responsible for the details of the Bureau's work throughout the year.

Additional staff having been sanctioned to meet the increased work, especially that connected with the survey of malaria in rice fields, three probationers were engaged as laboratory and field assistants from 4th January, in addition to four mosquito collectors. One of the previously trained collectors resigned, ceasing work from 5th September.

The Bureau's clerk Mr. F. J. Rosario resigned from 8th April, his work having since then been done by Mr. Lai See Foon, one of the probationary assistants. Mr. E. G. Montford was placed on special duty from February to May in order to assist in the malarial survey of rice fields, his services having kindly been lent for that purpose by the Senior Health Officer.

EQUIPMENT.

In the present year laboratory equipment has been brought up to date, but the building remains rather unsuitable, from the point of view either of a museum or a laboratory, gas in particular being lacking. The possible future needs in the way of staff and equipment for the carrying out of chemical and other investigations at the Bureau itself, and in the field by means of a travelling laboratory, need not be restated having been dealt with in last year's report.

FIGURES RELATING TO FIELD AND LABORATORY WORK.

Actual or potential breeding places examined ...	...	...	2,342
„ „ tested for p.H of the water ...	...	...	572
Adult anophelines captured and identified ...	...	...	2,734
Adults bred out and identified ...	...	...	329
Adult females dissected for parasites ...	...	...	955
Blood slides made and examined ...	...	...	446
Spleens examined ...	...	...	4,096

REPORTS.

Longer or shorter reports have been made on specimens, or enquiries received, or on work independently initiated, as follows :

To the Director of Government Laboratories on :—

- (a) Mites of the family *Myobiidae* found on a rat.
- (b) Yeasts present in an anti-malarial specific.
- (c) Mosquito surveys in rice fields of Negri Sembilan.
- (d) Interim summary regarding epidemiological facts relating to malaria in areas under padi.

To the Senior Health Officer on :—

- (a) Anti-malarial survey at the Gap and Bukit Fraser.
- (b) Larvicidal soaps.
- (c) Mosquito survey at Sungei Besi Mines.
- (d) The site proposed for the Decrepit and Leper Asylum at Sungei Buloh.
- (e) The use of "Paris Green".

Other Reports on :—

- (a) Gad flies of the genus *chrysops* and their destruction.
- (b) *Anopheles separatus* (to the Director of the Medical Laboratory, Java).
- (c) Larvae and adult mosquitoes received for identification from Rengam, Lenggeng, and Bukit Kiara Estates, and from the Acting Surgeon, Selangor.

EXHIBITIONS.

Anti-malarial exhibits including apparatus and photographs relating to oiling, housing, and drainage, together with chemicals used in destroying or repelling mosquitoes or their larvae, as well as living water-insects and fish which destroy mosquito larvae, were demonstrated at agri-horticultural shows at the following centres:

Taiping	...	...	...	...	25th July
Kuala Lumpur	...	...	...	...	31st July to 3rd August
Ipoh	...	...	...	...	4th to 6th September

This educational work, which proves attractive to the public, is increasing from year to year. Transporting and arranging the exhibits takes as much or more time than demonstrating them, and investigations, the value of which depends upon continuity, are liable to be seriously interrupted. As the number of distant centres at which anti-malarial exhibits will be called for is likely to increase further in future years, the question of ways and means to meet the demand merits consideration.

RICE-FIELDS INVESTIGATION.

The objects of this investigation, which was decided upon before my arrival, have been firstly to ascertain the facts relating to malaria and anopheline-breeding in selected areas under padi, and secondly to draw any conclusions as to the possibility of decreasing anopheline-breeding, and malaria, both in padi-growing areas, and elsewhere. In the latter direction the work has been guided by the desire to test the idea, already enunciated by Sir Malcolm Watson in his "Prevention of Malaria in the Federated Malay States" (1909), that differences in the character of the water determine the presence or absence of particular species of anopheline larvae, and in some cases the entire absence of anopheline-breeding. Accordingly numerous field tests have been made of the acidity (p.H), and ferruginous and other qualities of actual and potential breeding waters, and typical selected samples of water have kindly been analysed by Mr. Blair, the Senior Government Chemist. The results are of great interest, but would be of still more value if many more analyses had been possible. Reports dealing with the technical as well as the practical aspects of the investigation are in preparation, the salient facts ascertained, together with the conclusions they suggest, being summarised below:

1.—EPIDEMIOLOGICAL.

Spleen Rates.—Three thousand nine hundred and eighty-seven school boys were examined by Mr. Montford who found the following percentage of enlarged spleens, the number of scholars examined from each area being placed in brackets: Negri Sembilan (2,152) 14.5 per cent., Bukit Gantang (323) 10.0 per cent., Krian (1,512) 1.9 per cent. Sir Malcolm Watson's and Dr. Delmege's figures published in 1909 for the last two districts were Bukit Gantang (254 scholars) 38.2 per cent., Krian (718 scholars) 2.7 per cent. The spleen rate in Krian therefore remains practically unchanged, while there has apparently been a great decrease in the Bukit Gantang valley. The decrease is associated with a general settling down of the district, and the growing up of already planted rubber estates in proximity to the rice fields.

Blood Statistics.—In the Bukit Gantang valley, out of 218 blood slides taken from 218 Malay school boys, 13 or 5.9 per cent. showed infection with benign, and 13 with malignant tertian parasites, one slide showing a double infection. Only one crescent was observed, and this, together with the fact that of 45 slides made from adult Malays resident in the district, none showed parasites, affords evidence that a considerable degree of immunity is acquired in childhood and that it is practically complete in adult life. The total percentage of scholars infected with either benign or malignant parasites was 11.5. In Krian out of 135 school boys whose blood was examined 6 or 4.4 per cent. were infected with benign tertian, and three with malignant tertian, together with one mixed B.T. and S.T. infection. No crescents were seen.

In the absence from Krian of any anopheline proved to carry malignant tertian fever in the wild state, the possibility must be allowed for that the few boys whose blood harboured its parasites, may have been infected during journeys outside Krian.

Dissections.—Nine hundred and fifty-five captured anopheline females were examined for parasites, namely, 817 from the Bukit Gantang valley, and 138 from Krian. Of these one specimen only, a female of *A. barbirostris* captured in Krian near the Province Wellesley border in February, was infected, viz., with benign tertian cysts. The numbers of the various species dissected were as under:—

Bukit Gantang Valley: *A. sinensis* 317, *A. aconitus* 213, *A. vagus* 162, *A. barbirostris* 52, *A. kochi* 51, *A. tessellatus* 19, *A. umbrosus* 2, *A. karwari* 1
Krian: *A. barbirostris* 89, and *A. sinensis* 49.

The work is being continued in Krian. Immunity, and absence of gametes from the blood of all but a few young children among the resident population, may not improbably account for the small proportion of mosquitoes infected. No evidence has been obtained that there has been an increase of malaria in Krian in recent years. In certain estates outside Krian, however, the percentage of immigrant labourers who suffer from malaria after gathering in the padi harvest has increased in the last three years. These labourers live exposed to all weathers for nearly three months, sleeping under Malay houses, so that latent malaria is likely to become active. Since anopheline-breeding, never very great in Krian, greatly decreases at the time of the harvest, adult mosquitoes being increasingly scarce as it progresses, the chances of direct infection are small except during the first month. The resistance of the labourers is likely to be lowered especially in wet weather, and, as many of them come from malarious districts a certain amount of mutual infection through surviving anophelines is a possibility. The yearly influx of infected labourers living under bad conditions may not improbably be a contributory cause of malaria among the indigenous population, and may lead to its increase if the health of the labourers is neglected, and especially if they come in heavily infected.

2.—MOSQUITO-BREEDING.

Intensive surveys were made in the Bukit Gantang valley, and in Krian proper in the area between Bagan Serai, the coast, and Province Wellesley border. These two regions respectively cover about 8 and 50 square miles. Collections were also made in the outlying portion of Krian. The experimentally manured plots at Talang in Perak were examined three times in the year, and collections of larvae were made at intervals of some months in a number of localities in Negri Sembilan. Thus the data collected relate both to seasonal, and wide regional, differences.

Regional and Seasonal Specific Differences.—The numbers and percentages of the chief species captured were as follows:

Bukit Gantang Valley.—Of 591 larvae captured in fields in the cropping period 82.9 per cent. were *A. sinensis*, the remainder being *A. barbirostris*, *A. fuliginosus*, *A. aconitus* and *A. kochi*.

Fallows yielded 35.3 per cent. *A. sinensis*, 31.3 per cent. *A. barbirostris*, 14.1 per cent. *A. kochi*, 10 per cent. *A. aconitus*, a single *A. maculatus* and small numbers of *A. vagus*, *A. fuliginosus*, *A. tessellatus*, *A. novumbrosus* and *A. separatus*.

Of 1,541 larvae from plantations, kampongs and the edge of neighbouring jungle 38.8 per cent. were *A. kochi*, 20.7 per cent. *A. barbirostris*, and 18.8 per cent. *A. sinensis*, the remainder being *A. maculatus*, *A. karwari*, *A. vagus*, *A. aconitus*, *A. fuliginosus*, *A. separatus*, *A. tessellatus*, *A. leucosphyrus*, *A. aitkeni*, *A. umbrosus* and *A. novumbrosus*. All the *A. maculatus* were from near the road-side, or the railway.

Krian.—Of 3,620 larvae captured during the period of, and among the padi crop 64.8 per cent. were *A. sinensis*, and 35.2 per cent. *A. barbirostris*. Breeding was very restricted in the fallows, the stagnant water apparently becoming too acid, and perhaps otherwise unfavourable, on the peaty soil of Krian. A few larvae of the above two species were however found.

Anopheline-breeding in kampongs and plantations was also slight. Of a total of 360 larvae collected during the cropping or harvest season 66.9 per cent. were *A. vagus*, 15.3 per cent. *A. rossii* Giles, 16.1 per cent. *A. sinensis* and a small number *A. barbirostris*.

Negri Sembilan.—Valleys bordering the Seremban to Kuala Pilah, and Seremban to Tampin roads.

Of 44 larvae obtained in standing padi in November after heavy floods *A. fuliginosus* comprised 77.3 per cent., the remainder being *A. sinensis*, while in the preceding February near the harvest time 44.4 per cent. out of 432 larvae were those of *A. aconitus*.

Of 486 larvae found in fallows in May and August, in May *A. sinensis* formed 38.5 per cent. and *A. fuliginosus* 26.9 per cent., while in August *A. fuliginosus* formed 88.7 per cent. and *A. sinensis* only 4 per cent. of the captures. Small numbers of *A. barbirostris*, *A. kochi*, *A. vagus* and *A. karwari* made up the balance.

Density of Distribution.—An attempt was made to discover the relative abundance of larvae during the cropping period by counting the number caught in 100 dips of a dish $9\frac{1}{2}$ by $6\frac{1}{2}$ inches and $2\frac{1}{2}$ inches deep.

Larval distribution in Krian proved to be very uneven, very few larvae indeed being present except in a strip of high-yielding land south of the Province Wellesley border, and averaging rather over two miles in depth. In these fields 2,018 dips yielded 109 larvae, an average of 5 per 100 dips, the p.H. of the water averaging about 6.6. Over the border 169 larvae were captured in 2,100 dips, giving a percentage of 8. The remainder of the high-yielding land in Krian, holding water of a p.H. from 6.4 to 6.9 in the cropping period, and extending from five to six miles eastwards from the Kuala Kurau—Bagan Tiang Road, yielded only 74 anopheline larvae in 13,902 dips, a negligible average of .53 per 100. The acidic lands (with an average p.H. of about 5.5) extending some miles north and south from Bagan Serai gave even lower ratios, large areas apparently being entirely free from breeding. Altogether 23,816 dips made in rice fields and water conduits in Krian from 8th October to the end of the year yielded only 1.1 anopheline larvae per 100 dips. Collections made in Bukit Gantang valley from October 20th onwards yielded 494 anopheline larvae in 3,796 dips or 13 per 100 dips. Five hundred and eighty-six counted dips yielded 167 larvae in the manured and control plots at Talang in December, a rate of 28.5 per 100. Comparing these figures with Dr. Barber's average of 80 anophelines per 100 dips of a dish of nearly the same size from rice fields in the United States of America, it appears that the density of anopheline larvae among padi is considerably less in Perak. Individual fields both at Talang in Perak, and in Negri Sembilan have however occasionally yielded dip ratios, a good deal over 100. This method of counting had not been adopted when the main collections were made in Negri Sembilan, so that data for determining the average larval density there are lacking. The heavy floods in November, 1925, doubtless partly account for the low ratios obtained in Perak, and especially in Krian.

Larval Distribution in Relation to p.H., Etc.—All observations point to almost complete cessation of anopheline-breeding in standing padi when the acidity of the water falls to p.H. 6.0 or lower, and a sharp decrease below p.H. 6.4. Observations made in the same fields both in Krian and at Talang showed a fall of about .5 in the p.H. of the water between the middle of October and the middle of December and a further fall to about 6.0 is usual in pools in the less acid fields in Krian, when the water is drained off before the harvest. The effect of a lowered p.H., irrespective of the chemical causes which produce it, is illustrated by observations made in December 15th on neighbouring but differently manured plots at Talang. One hundred and sixty-nine larvae were collected and the numbers per 100 dips varied with the p.H. of the water as follows:

p.H.	No. of plots.		A. fuliginosus.		A. sinensis.		A. barbirostris.		Total of all anopheline larvae.	
6.6	...	5	...	23	...	13.7	...	.9	...	37.6
6.4	...	3	...	17	...	10.5	...	1.0	...	28.5
6.3	...	1	...	2.7	...	2.7	...	—	...	5.4

The same species of padi was grown in all the plots, and the crop averaged rather over three feet in height, so that the water was shaded. On 20th October when the water was only lightly shaded by the crop only *A. fuliginosus* was found to be present. The average p.H. of four selected plots was 7.1 at the earlier and 6.4 at the later date. Although individual determinations of p.H. in the field cannot always be relied upon to a decimal, these changes were well marked, and the relative average p.H. values do not admit of much doubt.

Other chemical factors also, some of them related to the p.H. of the water, doubtless determine the presence or absence of anopheline-breeding, as Dr. Hacker showed in his 1923 report. Among others, efficient aeration, and absence of an excessive amount of organic matter, are factors favourable to anopheline-breeding, as well as to the health of the padi crop, but more analyses will be needed before limiting values can be assigned with any certainty.

The general conclusions to be deduced from the investigation are that—

1. The species of anophelines which breed in rice fields during the cropping period are primarily marsh breeders, and the danger from standing padi is probably less than that from marshes, since anophelines have to colonise rice fields anew each year, few being present in the earlier stages of the growth of the crop. Moreover breeding is liable to interruption owing to fields being dried or flooded during cultivation.

2. The conditions for anopheline-breeding are in general the same as those for the health of the padi crop and acid and peaty land restricts breeding, both as to the species found (*A. sinensis*, *A. barbirostris*) and their abundance.

3. Those parts of Krian, however, where the water during the cropping period is not markedly acid, yield heavy and healthy crops of padi, but only the two above-named species of anopheline.

4. Except in Krian, anopheline-breeding in fallows is varied, and its dangers may not improbably exceed those arising from standing padi. More efficient drainage of fallow land than exists in indigenous systems of irrigation, and the growth of a drying cover crop, which incidentally would increase the profit from the land, are measures likely to diminish breeding.

5. Generally speaking, plantations adjacent to rice-fields, and the fringes of neighbouring jungles are potential sources of danger.

RELATED EXPERIMENTS.

These fall under two heads—namely, experiments to test the power possessed by rice fields' species of larvae to accommodate themselves to other water, and experiments upon the larvicidal power of predatory water insects, several species of which are common in rice fields, and of fish.

Experiments upon the Acclimatisation of Larvae in Alien Water.—Between the end of February and the beginning of May, including controls 100 experiments were made from Taiping, individual experiments lasting from three days to over three weeks. Bukit Merah Reservoir which supplies the Krian irrigation system with water, has so far proved free from anopheline-breeding. It was therefore of interest to ascertain whether anopheline larvae placed in its water can survive. For this reason it was selected as the main centre for experiment; and since *A. aconitus*, as explained in last year's report, has been suspected of being an important carrier of malaria in inland valleys under padi cultivation, this species being absent from Krian, it was tested first, in order to ascertain whether its absence from Krian is to be attributed to the properties of the water supply, rather than to the character of the Krian soil. Larvae were placed in floating cages, six inches in diameter, made of split bamboo, and covered with muslin. Both dead and living larvae were counted at each visit, and dead larvae preserved for dissection. This work was carefully and conscientiously performed by Mr. Basimin, who visited the reservoir two or three times weekly. Some of the experiments made there, as well as those in Taiping, were spoiled by flood-water and drift wood, or by human agency. The best number of larvae to place in a cage had first to be ascertained. In seven experiments with 15 or 20 larvae per cage only 6.7 per cent. of adult *A. aconitus* emerged. In four experiments with ten larvae present the percentage was 27.5, and in four when five larvae only were put in 50 per cent. of adults emerged. In only one of the first group of experiments with from 15 to 20 larvae was any food placed in the cages, and since staleness of the water is hardly possible inside a floating cage with open-work bottom and sides, the relatively low percentage of emergences in this series is probably attributable to starvation. Owing to failure to obtain enough larvae near Taiping, the *A. aconitus* larvae, and some of those of other species used, were sent twice weekly by train from Kuala Lumpur, and arrived underfed, a fact proved by dissected specimens affording evidence of cannibalism. Owing to the claims of other work the experiments had to be given up when only four had been made with five *A. aconitus* larvae per cage. The larvae used in all the experiments were nearly full grown, and the average length of time before the emergence of the last adult was only five days in these last experiments made with five larvae. Therefore the fact that 50 per cent. of these larvae turned into adults, while affording proof that Bukit Merah water is not rapidly poisonous, does not prove that unfed larvae hatching from the egg could survive to maturity in the water.

No eggs of *A. aconitus* were available to test this point, but two lots of eggs of *A. barbirostris* were placed inside paraffin rings in cages of three inches diameter, in two batches of 50 each. Twelve and 15 eggs respectively out of 50 hatched in Bukit Merah, all the larvae dying within 8 and 24 days respectively, three larvae of the second batch surviving 16 days. In the laboratory, control experiments were made with batches of 50 eggs from the same laying, placed in water in which larvae of this species had been found, and respectively 28 and 31 eggs hatched. The first lot of larvae were left unfed and all died, the second batch was not fed until the surviving larvae were reduced to six. These were then fed, and all pupated and three emerged. These facts point to the conclusion that the water of Bukit Merah is not at all rapidly poisonous to larvae of *A. barbirostris*, but that it perhaps lacks nutriment. The latter conclusion is supported by two experiments with nearly full grown larvae of *A. barbirostris*, placed with food, five in a cage, in Bukit Merah. Two adults emerged in each cage, while in two control experiments each with five larvae of the same batch, kept, the one in Bukit Merah water without food, and the other in the water in which the larvae had been found, with addition of algae and thinly sprinkled baker's yeast, respectively, one and three adults emerged. Of twenty of another batch of larvae of *A. barbirostris* placed in a cage unprovided with food in Bukit Merah all died, while three adults were obtained from an overcrowded control experiment in which the same number of larvae were placed with algae in a circular dish of the same diameter (6") as the cages used.

On the limited evidence of these experiments, overcrowding and consequent insufficiency of food are a more important cause of nearly full-grown larvae dying out, than any direct influence exerted by the water of Bukit Merah. This conclusion is supported by the fact that under similar experimental conditions practically the same percentage of adults of various species emerged in Taiping Lake, as in Bukit Merah. Larvae of *A. sinensis*, *A. barbirostris*, and *A. fuliginosus* breed in the lake, which in places contains an abundance of a species of chara, probably the common Malayan species (*C. gymnopytis*). It appeared to have little or no prejudicial effect upon larvae of *A. aconitus* in the laboratory, but in each of two experiments, one with five larvae of *A. aconitus*, and one with five larvae of *A. fuliginosus*, when this chara was placed in their cages in the lake no adults emerged, fed laboratory controls giving an emergence of 50 per cent. in each case. In the remaining experiments the cages were placed near the growing masses of chara, but none was placed in them.

The results with batches of five larvae per cage, all containing either algae, or algae and yeast, were as follows, the number of experiments performed being printed in brackets and the percentage of emergence in italics:

Bukit Merah: *A. aconitus* (2) 50, *A. barbirostris* (2) 40.

Taiping Lake: *A. aconitus* (3) 50, *A. barbirostris* (2) 50. *A. fuliginosus* (3) 47.

Thirty per cent. of adults of both *A. sinensis* (3), and *A. fuliginosus* (2) emerged from lots of ten larvae placed with food in Bukit Merah, a figure practically identical with that given above for *A. aconitus* (4), namely 27.5 per cent., algae or algae and yeast being added in three out of four of the latter experiments, and bladderwort from the reservoir in the fourth.

The water in Bukit Merah and that in Taiping Lake differ markedly, the one being peaty with a p.H usually a little below 6.0 and the other non-peaty, with a p.H ranging up to 7.0.

The fact that about equal percentages of adults of all the species tested under similar conditions emerged in each, differences apparently depending only upon the extent to which larvae were crowded, seem to show that the food factor was the determining one, and to suggest the conclusion that the presence and abundance both of anopheline larvae, and of adults arising from them, is largely determined by the quantity of nourishing food present in the surface layer of natural waters, this, when not replenished, being rapidly exhausted by the almost ceaseless activity of the mouth brushes of larvae crowded together. The nature of this food is referred to in the last paragraph of this report. Algae appear to contribute to it chiefly indirectly by the infusoria, etc., they harbour, and by the products and associates of their decay, their main function being to purify and oxygenate the water.

Nineteen field and 22 control experiments were made in Krian in February, at a time when the water had been cut off from the fields, and was stagnating. Most of the field experiments were interfered with either by floods, or by human agency; and in some places the water was drying up. In one experiment a water boatman effected an entrance, and in one night ate more than half the larvae put in. In one experiment only, started on 9th of February, did adults emerge, namely, six out ten *A. aconitus*, whose larvae had been obtained from Kuala Lumpur. The water in which this cage was placed was at a spot (Kampong Kedah) where it accumulates in a hollow, and remains fresher than in most parts of Krian, permitting anopheline-breeding to go on in the fallow season. In single experiments in acid and very stagnant water near Simpang Lima, having a p.H below 5.0, larvae of *A. aconitus*, *A. separatus* and *A. aitkeni* all died in about two days. The same fate overtook a mixed collection of larvae of *A. sinensis* and *A. barbirostris*, and also one containing larvae of *A. sinensis* only. No anophelines are ever found in this water, and apparently none can live in it. A decreasing percentage of larvae of *A. umbrosus* and *A. novumbrosus* however, taken from peaty water of equal or greater acidity, survived in it up to one week in a cage placed at the same spot, by which time all were dead.

None of the Krian waters tested at the time in the laboratory proved capable of keeping larvae alive, or of giving rise to adults unless pupation occurred within three days. This is in accord with the fact that mosquito larvae become scarce after the water is cut off, and increasingly so as the harvest progresses, and the water becomes staler. On the whole larvae of *A. sinensis* survived longer at the beginning of February, than they did a fortnight later, when kept in the water in which they had been collected, near the Province Wellesley border, where breeding is most abundant.

An experiment made on 11th February with this water gave over 50 per cent. of survivals of larvae of *A. sinensis* after ten days, while on the average of two parallel experiments, started in the laboratory on the same day, in the much more acid water from near Simpang Lima, less than 4 per cent. of larvae of *A. sinensis* survived as long. The water however proved less rapidly fatal than it did *in situ*.

LARVICIDAL POWERS OF WATER INSECTS.

These are usually plentiful in rice fields. They may for practical purposes be divided into inactive water bugs of the family *Nepide*, which seize and suck their prey without rapid pursuit, and active predatory insects such as certain water beetles, nymphs of may-flies, and, among suctorial insects, water boatmen, and the bugs of the family *Belostomidae*. Most of these types were tested in a series of experiments extending over several weeks, results being checked by examination of dead larvae under the microscope, in order to ascertain if they had been sucked out by the various bugs.

By far the most efficient insects were the large belostomid bugs of species (sphoerodema or its allies) in which the male carries the eggs of the next brood on its back. One of these ate 65 out of 70 culicine larvae in 9½ hours; and the young nymphs attacked large anopheline larvae immediately on hatching, hanging on two or three at a time. The small corixas, and water boatmen generally, though less individually efficient compensate by their numbers, over 200 having once been captured in a single dip of a standard pie dish at the edge of a rice field in Krian. No mosquito larvae can survive in such a situation. The belostomid nymphs were easily reared in the laboratory, and dried water boatmen are already an article of commerce in Chinese shops. The breeding of these species on a large scale, and their introduction into fish ponds, which are prolific of anophelines and are seldom if ever oiled, might be a practicable measure. Most of the insects are more efficient destroyers of culicine than of anopheline larvae, owing to the diving habits of the former. This is especially true of *Ranatra*, as compared with *Cercotmetus*, which is unfortunately comparatively rare. The great scarcity of culicine larvae in rice fields must be largely contributed to by the activity of water insects. Experiments with a newly hatched *Ranatra* kept in a small cup proved that it attacked and sucked very young anopheline and culicine larvae, killing more of the latter. *Ranatras* have however been observed feeding in the fields upon both may-fly nymphs and small water boatmen, and they may do as much harm as good.

Although the conditions of experiment greatly influence results, the following figures roughly indicate the relative efficiency of the various insects tested, and accord with the general conclusions arrived at independently. They were obtained by dividing the average number captured by one insect in 24 hours by the average number of larvae or pupae present per square inch of water surface throughout each experiment, due allowance being made for their diminishing concentration, and are expressed in round numbers.

RATIOS OF EFFICIENCY.

Insects.	Depth of water.	For Anoph.	For Cul. L.	For pupae.
Inactive insects— <i>Cercotmetus</i> —	(Average for expts. with water 1" to 4" deep. Found efficient in both) ...	15	14	15
Nepa	½ inch to 1 inch...	8	12	12
Do.	4 inches ...	4	8	
Ranatra	1¼ " ...	10	20	12
Do.	4 " ...	Relatively inefficient	Efficient	
Small demoiselle dragon fly larva ...	2 to 4 inches ...	Relatively inefficient for both anopheline and culicine larvae. Many experiments negative		
Active insects—				
Large belostomid bug	1 inch ...	40	50*†	50*†
Do.	4 inches ...	About equally efficient		
Small water boatman	4 inches ...	4	8	
Small dytiscid beetle	4 " ...	10	12	10
Large dytiscid beetle ... ..	... ..	0	0	0

* Indicating that on the average all the experimental organisms were killed in less than 24 hours, an upper limit not being assignable. With an average concentration of 2 larvae per square inch of water, the coefficient 50 would indicate that 100 larvae had been eaten in 24 hours.

LARVICIDAL POWER OF CERTAIN RICE-FIELDS FISH.

Rice fields often abound in small surface-feeding fish, such as *Panellax* sp. the larvicidal powers of which are well established. In Krian the flooded fields also contain numbers of large fish, especially the two species of sipat, *trichopterus* (*Osphromenus*) *trichopterus* and *T. leeri*, which form a large part of the local food supply, and are dried in quantity for future consumption when the fields are emptied at harvest time. The destructiveness to anopheline larvae of sipats about six inches long, kept in captivity, proved to be small, and no greater than that of a half grown aruan, *ophiocephalus striatus*, which is a bottom feeder, and is not usually considered to eat anopheline larvae. When fed exclusively on these, one of the sipats died within three days, but the other was still vigorous after eight days. On the average the two together ate four larvae daily between them, and the largest number eaten by a single fish in one day was 12 larvae out of 20. The largest number eaten in a day by the aruan was 18 out of 20 after it had been starved for a day, and the average was four larvae daily. Mr. E. Seimund who kindly identified the specimens, informs me that sipats eat culicine larvae greedily in captivity. Probably however all the larger fish, not being top feeders, are ineffectual destroyers of anopheline larvae in rice fields, which are stocked with an abundance of alternative food. It would be of interest to ascertain whether they feed on any of the water insects which eat mosquito larvae.

The small pipe fish (*hemiramphus cantoris*) called jolong, found in some of the irrigation ditches in Krian, although almost as much attached to the surface of the water as anopheline larvae, apparently does not find them easy to capture. Owing to the fact that its upper lip projects half an inch beyond the lower, to form its snout, it is difficult for the fish to suck in larvae from below as other fish do. Two individuals ate an average of four larvae daily between them, the largest number eaten in a day by the two together being 8 larvae out of 20.

ASSOCIATED FLORA.

Collections were made of plants characteristic of the regions in Perak for which the specific density of anopheline-breeding was determined, the specimens being kindly named by Mr. W. N. Sands. Among submerged plants a yellow-flowered bladderwort (*utricularia flexuosa*) replaces in Krian, and in Bukit Merah, the chara found in some of the non-peaty fields elsewhere; and its presence appears to characterise either the limitation of anopheline species to *A. sinensis* and *A. barbirostris*, or the complete, or nearly complete, absence of all anopheline breeding, as in the acidic fields in Krian, and in the Bukit Merah Reservoir.

The tracts on either side of the Province Wellesley border, which have already been noted (page 42) as having the greatest density of anopheline larvae during the cropping period, were characterised in the fallow season by dominance of a giant reed (*scirpus grossus*), large tracts of country being covered with a growth over six feet in height. It is associated with a red balsam, *hydrocera angustifolia*, which has not been met with in rice fields elsewhere, but is fairly widely distributed over Krian. Both these plants extend up to, if not beyond, the border of the acidic lands, which are for the most part covered by herbage, and shorter reeds of various species.

A red bearded grass (*pennisetum typhoideum*) is conspicuous during the fallow season in the coastal strip between Bagan Tiang and Kuala Kurau. Though only about two feet high it covers the fields, which in consequence appear brick red. Incomplete surveys during the fallow failed to reveal either anopheline or culicine larvae, the shallow water being highly ferruginous. A thorough survey in the cropping season gave a very low larval density (0.9) over this tract. The water has a fairly high average p.H value of about 6.8, and is more saline than in the rest of Krian. According to report the land was reclaimed only about 20 years ago, when the old coast road was replaced by the new road, which runs a mile nearer, and close to, Kuala Kurau River. The predominance of the grass in question, which is fairly widely distributed elsewhere in Krian without being a conspicuous feature of the landscape, is no doubt determined by the chemical characters of the soil, which in their turn regulate anopheline-breeding.

Some fallow weeds, such as the yellow flowered willowherb-like *Jussiaea fruticosa*, are common both to Krian and the Bukit Gantang valley, while others are distinctive. The differences correspond to a much greater variety of anopheline species found in the Bukit Gantang fallows, but the local predominance within them of any particular plants, associated with the prevalence of particular species of anophelines, has not so far been disclosed, and is hardly to be expected in so small an area. Information is to be sought in the study of the floral associations of these fields, compared with those of others situated in hill valleys elsewhere.

The two following further investigations were carried out by me during the year:

Larvicidal Properties of Minerals from Beatrice Mine, Ipoh.—Three minerals were procured for me by the courtesy of Mr. A. E. Kershaw, Assistant Warden of Mines, at Ipoh, with whom I visited the mine.

White Arsenic (arsenious oxide).—Two varieties of this compound exist, which have solubilities respectively of one in 108 and one in 353 parts of water. The latter alone being stable is probably the main constituent of bulk samples. Powdered lightly on water the oxide killed all anopheline larvae within $7\frac{1}{2}$ hours, and all culicine larvae within $75\frac{1}{2}$ hours. Only one out of 24 control larvae died in this time. The anopheline larvae were doubtless killed by eating the floating powder, which dissolved slowly.

The effect of the dissolved poison was tested by allowing the same sample to saturate, or nearly saturate, a small beaker full of water five times over, and testing each clear filtrate separately. The arsenic was allowed to remain in the water from one night to several days, the conditions approximating to those in a pool which has been heavily dosed. In four experiments with anopheline larvae, on the average all were killed within $2\frac{3}{4}$ hours, and in one experiment pupae were killed within three days. When water was allowed just to cover the residual arsenious oxide left after five previous experiments, and was left standing for a week, the completely saturated solution obtained, killed six anopheline larvae within 35 minutes, and six culicine larvae within an hour. The saturated solution diluted ten times killed all of both anopheline and culicine larvae within two hours. This proves that the residue was fully as potent as the original sample. In order to test the conditions which might be expected in slowly running water, the residue from the fourth filtrate was left in a beaker full of water under a dripping tap for over 24 hours. At the end of this time the content of the beaker was quickly filtered and tested. All culicine larvae were killed by it in nine hours, and four out of six anopheline larvae in $9\frac{1}{2}$ hours. One anopheline pupated and emerged, and the remaining larva died within 22 hours. In these experiments all controls lived. The use of arsenic in any form is dangerous and cannot be recommended as a general expedient. The rate of solution of white arsenic would require to be in some way regulated if it were adopted as a larvicide. As however a surplus, believed to be sometimes difficult to get rid of, is produced in some mines in the Federated Malay States, the larvicidal power of the compound is of interest.

Unroasted Amang from this mine proved slightly toxic to larvae but its utility is doubtful.

Roasted Amang.—This is a ferruginous residue which kills larvae in a few hours when added fresh in sufficient quantity, proving slowly toxic, a fact possibly in part due to iron dissolving in the water. The presence of iron in the water was proved by the Prussian blue test, and by a slowly formed brown precipitate of iron oxide. As the amang is a complex mixture its toxic power however is probably due to other ingredients as well.

Ten anopheline larvae placed in their own water covering a thick sediment of of the amang all died within 15 hours, but eight more larvae placed in a fresh sample of similar water with the residual sediment, took longer to kill, all however dying within $39\frac{1}{2}$ hours. The amang therefore loses some of its power on standing in water.

In another experiment about 80 anopheline, and six culicine larvae, and six pupae were introduced into a vessel containing about four inches of water with just enough of fresh amang to cover the bottom. Five out of the six pupae hatched out, but the remaining pupa, and all the larvae, died within three days. Only 16 anopheline larvae lived after 21 hours, all the controls being then alive. It therefore appears that if roasted amang were used liberally in pools and ditches it would prove a fairly efficient larvicide.

The following investigations bearing upon practical measures remained incompletd at the end of the year:

Effect of Explosive Percussion upon Mosquito Larvae.—At the instance of the Principal Medical Officer experiments were arranged to test the effect of a small amount of high explosive exploded under water, out of doors; but the experiments had to be abandoned owing to failure to obtain permission from the local authorities for their prosecution. Tests carried out in the laboratory with Chinese crackers showed that anopheline larvae were not stunned by the explosion of a charge of nitro-powder placed under a four-gallon petrol tin full of water, and large enough to upset it. A much sharper shock however would result from an explosion under water, and the question raised is of theoretical interest, as well as possible practical importance.

Larvicidal Properties of Rubber Oil.—Tests carried out by Mr. Rajamoney at the instance of the Senior Health Officer proved that the oil was an effective larvicide; and the further fact that the admixture of rubber with solar and crude oils considerably increases their efficiency has since been ascertained.

Larval Food.—When possible, experimental and microscopical work has been carried out, and the larvae of different species from various localities have been dissected in order to ascertain the nature of their food. This work requires settled conditions, which have been difficult to realise while extensive surveys with other objects in view have been in progress.

So far as the work has gone it shows that algae, especially the more conspicuous forms, although associated with anopheline larvae, usually form only a small portion of their food, the bulk of which is of an amorphous character, and of obscure origin. An instance is under investigation where nearly fully grown, but not smaller, larvae of *A. barbirostris* have been found feeding to a very slight extent upon floating masses of a filamentous blue green alga, resembling *oscillatoria*, occurring in a drainage channel between two rice fields near Kuala Lumpur. The larvae have so far been associated with small numbers of those of *A. sinensis*, *A. fuliginosus* and *A. vagus*, and the p.H of the ditch has varied from about 5.3 up to 5.6. This fact is important, as it shows that abundant breeding of some of the same species as are found in the rice crop, may occur in water of a much greater degree of acidity than is favourable to them in the rice fields themselves, provided that there is a plentiful supply of food, and that other conditions, at present not fully known, are also favourable.

Among artificial foods, yeast sprinkled very lightly on the water is sometimes efficient, and *A. maculatus* has been reared from half-grown larvae placed with it in distilled water. There is good warrant for pursuing these enquiries, since in small accumulations of water, such as seepages, pools and ditches, the destruction by a slowly dissolving chemical of the delicate organisms which elaborate, and form part of, the food of anopheline larvae, promises more permanent success, at less cost for labour, than frequently repeated oiling, which aims at killing larvae rapidly and directly.

It remains to add that the Bureau's staff has worked well under more than usually trying conditions, occasioned by the heavy rain and floods of the latter part of the year. Great help has also been received from District Officers in carrying out work among Malay cultivators.

K. B. WILLIAMSON,
Malaria Research Officer.

REPORT OF THE CHEMIST UPON THE WORK OF THE CHEMICAL LABORATORY, INSTITUTE FOR MEDICAL RESEARCH, FOR THE YEAR 1925, WITH APPENDICES.

The chemical work of the following departments is performed wholly or in part in the Chemical Laboratory—Medical, Trade and Customs, Police, Railway and Public Works.

The total number of samples examined in the course of the year was 6,021 as compared with 7,368 in the preceding year, a decrease of 1,348. There has been a decrease of 726 in the number of samples of chandu dross. The number of samples of coins and coining materials has fallen from 1,046 to 495. There are notable increases in the number of samples of chandu, articles for blood stains, and alcoholic liquors.

I.—MEDICAL DEPARTMENT.

Chemical work is performed for the Medical Department in connection with the Health Branch and the Hospitals Branch. The samples submitted may be classified as follows :

- (1) Milk;
- (2) Water;
- (3) Sewage effluent;
- (4) Toddy;
- (5) Exhibits for toxicological analysis;
- (6) Miscellaneous articles.

(1) *Milk*.—The following standards are prescribed for milk in the rules of "The Sale of Food and Drugs Enactment, 1913" :

- (a) The quantity of milk fat present in milk must not be less than 3.25 per cent. of the total component parts thereof;
- (b) The quantity of milk solids, other than milk fat, present in milk must not be less than 8.5 per cent. of the total component parts thereof.

Seven hundred and forty-one samples were examined to ascertain whether they conformed to these rules. Of these, 19 contained less than 3.25 per cent. of milk fat, and 126 contained less than 8.5 per cent. of milk solids, other than milk fat.

In addition, 12 samples of milk from the Kuala Lumpur Dairy, which supplies the hospitals in Kuala Lumpur, were examined bacteriologically.

(2) *Water*.—More interest is being taken with regard to the provision and maintenance of pure water supplies. Water plays an important role in the prevention of disease, and by providing a pure supply the public are guarding against the possibility of illness by water-borne diseases.

Remarkable progress has been made during the last few years in discovering new and modified processes of treatment with the result that a water can be purified to any standard that is required.

The jungle streams of the Federated Malay States are the chief sources of supply. The waters from these streams are passed into service reservoirs and in a few cases are filtered.

Chemical analyses were carried out on 328 samples and bacteriological examinations on 36 samples of water. The chemical examinations of the raw and filtered waters of the Kuala Lumpur supply numbered 211 and the averages for each month and for the year are shown in appendix B.

The raw waters are filtered through sand filters and the filtered water passed into service reservoirs, the Maxwell's Hill Reservoir being an open one and the Weld Hill Reservoir a covered service reservoir.

The averages differ only slightly from those for the year 1924 although the rainfall in 1925 was considerably higher.

The following public supplies were visited and reports, based on chemical and bacteriological examinations, were made :

Fraser's Hill, Bagan Serai, Kajang, Taiping and Telok Anson water supplies.

(3) *Sewage Effluents*.—During the year, various types of sewage installations have been erected in Kuala Lumpur. Samples of the resulting effluents from these installations have been collected and examined. In the majority of cases, the effluent has failed to conform with the standards prescribed in the report of the Royal Commission on Sewage Disposal.

For experimental purposes, an installation, based on the “Activated Sludge” and “Bio-aeration” processes, is in course of erection in the Circular Road.

The number of sewage effluents examined during the year was twenty-six.

(4) *Toddy*.—Premises on which toddy is sold are open to inspection by officers of the Health Branch, who are also empowered to take samples for analysis. The samples were examined to ascertain whether they complied with the standards prescribed in the rules of “The Sale of Food and Drugs Enactment, 1913,” viz., “toddy must not contain more than ten per centum of alcohol by volume or have an acidity exceeding 0.8 per centum expressed in terms of acetic acid”.

The number of samples examined was 262, one of which was found to have an acidity exceeding 0.8 per cent. expressed in terms of acetic acid.

(5) *Toxicological Analyses*.—Twenty-four exhibits were submitted by the medical authorities. These included viscera, foods, and medicines for suspected poison.

Human Poisoning.—Six cases were investigated, a very small trace of arsenic being found in one case.

Animal Poisoning.—The viscera from four animals were examined for arsenic—arsenic being found in one case.

Miscellaneous Exhibits for Poison.—Samples to the number of fourteen were received for examination for poison, these included samples of toddy, food, carbon tetrachloride, white ant killer, medicine and smudge sticks. In one sample of smudge stick, arsenic was found.

Miscellaneous Samples.—Twenty-seven miscellaneous samples, comprising disinfectant, coffee, flour, condensed milk and medicine, were reported on.

VITAMIN B. EXTRACT.

The preparation of this extract from rice polishings, for use in the treatment of beri-beri, was continued throughout the year. During the year 6,056 fluid ounces were prepared and 7,685 fluid ounces were issued to medical practioners, dispensaries, and hospitals. One thousand two hundred and eighty-three fluid ounces were issued free, the remainder was sold at 25 cents per fluid ounce, this being the estimated cost of production.

During the year, experiments with the above-mentioned extract have been carried out by Dr. A. Neave Kingsbury, Pathologist, Institute for Medical Research. The results obtained indicate that the method of extraction is a highly efficient one.

As the subject of the extraction of vitamins is occupying the attention of many scientists, the methods of extraction of the vitamin B. from rice polishings are detailed below.

The present method differs very slightly from the original method as carried out by Fraser and Stanton in the year 1911.

(1).—ORIGINAL METHOD.

Polishings in quantities of 180 grms., being the amount required by twelve fowls in three days, were mixed with 1,000 c.c. 0.3 per cent. hydrochloric acid, stirred during the day and the following morning filtered through a Buchner's filter. 100 c.c. of 0.3 per cent. hydrochloric acid were used to wash out the vessels. When fluid could no longer be extracted from the mass it was mixed with 600 c.c. of 0.3 per cent. hydrochloric acid stirred during two hours and thereafter filtered as before.

The extracted polishings were mixed with distilled water, nearly neutralized with sodium carbonate, and the volume adjusted to 1,080 c.c., 30 c.c. of this emulsion contained 5 grms. of polishings less the materials dissolved out by the acidulated water.

The combined filtrates obtained from 180 grms. of polishings were nearly neutralized with sodium carbonate and concentrated at a low temperature to a volume of 1,080 c.c., 30 c.c. of this suspension contained the substances solved out by acidulated water from 5 grms. of polishings.

(2)—PRESENT METHOD.

Rice polishings, preferably fresh from the mill and of the best quality, are sifted to remove portions of husk and broken rice.

The polishings are extracted with four times their weight of 20 per cent. alcohol containing 0.1 per cent. hydrochloric acid.

The extraction is conveniently carried out in upright cylindrical jars of about five litres capacity. The fluid is left in contact with the polishings for one week, the whole being well stirred daily to facilitate extraction.

Three jars are worked up daily as follows :

Jars.	(1st).	(2nd).	(3rd).
Polishings	750 grms. ...	750 grms. ...	500 grms.
Ninety-five per cent. alcohol	600 c.cs. ...	600 c.cs. ...	400 c.cs.
Water	2,400 ,, ...	2,400 ,, ...	1,600 ,,
Pure hydrochloric acid	3 ,, ...	3 ,, ...	3 ,,
Filtrate about	2,500 ,, ...	2,500 ,, ...	1,700 ,,

Total filtrate from three jars about 6,700 c.cs.

The fluid is filtered off through Whatman No. 3 filter paper by means of large Buchner funnels and water suction pumps. The residue is pressed to secure a maximum yield of filtrate.

From 2,000 grammes of polishings about 6,700 c.cs of clear yellow filtrate are obtained.

The filtrate is concentrated under reduced pressure (about 40 mm. of mercury) to about 800 c.cs. and made up to 900 c.cs. with distilled water, then 100 c.cs. of distilled alcohol added.

The products obtained from five concentrations are allowed to stand two or three days without shaking to enable the precipitate to settle. The supernatant liquid is then poured through a Whatman No. 2 folded filter paper and when the liquid has filtered the precipitate is poured on the filter. The precipitate on the paper is washed once or twice with very small quantities of water the washings being added to the main filtrate, and water added to make up to 5,000 c.cs.

One c.c. of this extract represents two grammes of the original polishings. It contains about 9.5 per cent. of alcohol as a preservative.

II.—TRADE AND CUSTOMS DEPARTMENT.

The work for this department consists mainly in the examination of samples in connection with the assessment of duty, e.g., wines, potable spirits, liquors and denatured spirits, and samples of chandu and chandu dross, submitted by the Chandu Monopoly Department in connection with the administration of the Chandu Enactment.

LIQUORS.

In connection with the assessment of duty, 131 samples of alcoholic liquors were tested for their spirit strength. In addition eight samples were examined for denaturants, all of which were found to contain the necessary ingredients.

TODDY.

The acidity and alcoholic strength were determined in 28 samples.

CHANDU.

Under the provisions of the Chandu Enactment, the importation of chandu of other than Government manufacture is prohibited. The Enactment, further, makes it an offence to be in possession of :

- (a) any chandu reprepared from dross;
- (b) more than seven and a half tahils of Government Chandu.

N.B.—One tahl equals approximately 37.8 grammes.

Four hundred samples of chandu and substances suspected to contain chandu were received. Of these, 209 were found to be Government Chandu, 167 illicit chandu, 5 chandu prepared from Government Chandu dross, and 4 imitation chandu containing no opium.

CHANDU DROSS.

The Chandu Monopoly Department purchases chandu dross from licensees at prices varying with the quality of the dross. The chandu dross is collected by the Chandu Monopoly Department and weekly inspections of the dross are carried out by a Chemist from this laboratory.

The number of samples inspected during the year was 3,180.

The samples examined were graded as follows :

Grade I	...	...	...	...	...	...	...	...	3,090
„ II	...	...	...	...	...	...	...	...	72
„ III	...	...	...	...	...	...	...	...	18

DELETERIOUS DRUGS.

Under the provisions of “The Deleterious Drugs Enactment, 1911,” it is an offence to import, sell, or use without licence certain drugs (morphine, cocaine, eucaine, etc.) or preparations containing more than a certain percentage of these drugs. In suspected cases, the officers of the Customs Department take samples which are examined in this laboratory.

The number of samples received for examination was 24.

No deleterious drug was found to be present in any one of the samples.

MISCELLANEOUS SAMPLES.

In connection with the administration of the Customs and Excise Enactments, twenty-eight samples examined, included samples of turpentine, alun, mineral oil, “ganja”, rangoon oil and china clay.

III.—POLICE DEPARTMENT.

Six hundred and fifty-one samples were received from the Police Authorities in connection with proposed proceedings in the Courts.

These may be classified as follows :

- (1) Coins and coining materials;
- (2) Articles for blood stains;
- (3) Toxicological analyses;
- (4) Liquors;
- (5) Deleterious drugs;
- (6) Miscellaneous.

(1) *Coins and Coining Materials*.—The number of exhibits examined was 495. Of these, 236 were counterfeit coins, 5 genuine coins, and 16 moulds. In addition, pieces of metal and chemicals used in the manufacture of counterfeit coins were received for examination.

(2) *Articles for Blood Stains*.—Exhibits in connection with murder cases, etc., are forwarded by the Police Authorities for examination for blood stains. The number of exhibits received was 107, of which 39 gave positive results. The exhibits which gave positive reactions for blood were further examined by the precipitin test for human serum; 35 of these gave the reaction characteristic of human serum.

The results of the examinations are tabulated below :

Exhibits.	Number examined.	Number blood-stained.	Number human blood.
Knives, parangs, etc. ...	29	9	9
Articles of clothing ...	66	23	19
Wood, mats, attap, etc. ...	11	6	6
Glass beads ...	1	1	1

(3) *Toxicological Analyses*.—Thirty exhibits were received for examination. Of these, 16 were human viscera, in 6 of which poison was identified.

Opium was found in 2 cases, morphine 1, acetic acid 1, arsenic 1 and strychnine 1.

In the last case, liquor strychninae hydrochloridi had been given in mistake for another medicine, strychnine was found in the stomach and intestines.

Other exhibits received in connection with cases of human poisoning included four vomits, two samples of urine, and four medicines. The poisons identified were morphine in two exhibits, opium one, arsenic one, strychnine one, and the alkaloids of datura stramonium in one.

In addition one sample of water was examined for the presence of potassium cyanide with negative results.

(4) *Liquors*.—The alcoholic strength was determined in five samples.

(5) *Deleterious Drugs*.—Two samples suspected to contain one of the drugs specified in "The Deleterious Drugs Enactment, 1925," were examined with negative results.

(6) *Miscellaneous*.—There were 12 miscellaneous samples, six of which were found to be "ganja". Included also in this total were two exhibits which contained seeds of datura.

The scene of a bomb outrage was visited and the debris collected. The results of the examination of the debris indicated that the explosion had been caused by an electrically controlled bomb.

IV.—OTHER DEPARTMENTS.

Samples examined for the Railway Department consisted largely of materials purchased for the public service. They included lubricating and axle oils, and minerals. Samples of water were examined for the Railway Department as to their suitability for use in boilers and for domestic purposes.

One sample of water and two samples of aluminium sulphate were examined for the Public Works Department.

The Forest Department submitted samples of "damar", and other forest products for examination.

Four samples of collodion were examined for the Survey Department.

Five patent specifications in connection with "The Inventions Enactment, 1914," were reported on for the Federal Secretariat.

PRIVATE ANALYSES.

Seventy-seven examinations were carried out. Included in this total were samples of water, kerosine oil, milk, and condensed milk. Samples of rice were examined for the Principal Medical Officer, British North Borneo, and exhibits for blood stains for the Chief Police Officer, Kedah.

The fees for these analyses amounted to \$1,190.

LEGAL PROCEEDINGS.

Members of the staff of the Chemical Department gave evidence in legal proceedings in 19 cases.

STAFF.

The staff of the Chemical Laboratory consists of:

- Chemist;
- Three Assistant Chemists;
- Five Laboratory Assistants;
- One Laboratory Attendant;
- Two Attendants for gas plant.

Mr. J. Shelton returned from vacation leave on 1st March, 1925.

Mr. H. Marsden proceeded on leave on 14th March, 1925, and returned on the 17th December, 1925.

Dr. F. E. Byron was appointed an Assistant Chemist on 17th October, 1925, and assumed duty on 20th November, 1925.

Through the kindness and courtesy of the Government Chemist, Sir Robert Robertson, F.R.S., London, Mr. Marsden worked for three weeks at the Government Laboratories, Clements Inn and the Custom House, London. The majority of the sub-departments were visited and special attention was devoted to the study of the latest methods employed in the examination of foods, alcoholic products and oils.

Mr. Shelton, on casual leave in December, 1925, visited the Government Laboratory, Bangkok, Siam, and was offered every facility for examining laboratory processes by the courtesy of the Director, Mr. A. Marcan, F.I.C. The manager of the Government Opium Factory at Bangkok personally demonstrated the modern and efficient apparatus installed for the treatment of raw opium and the packing of chandu in tubes for distribution.

INSTITUTE FOR MEDICAL RESEARCH,
FEDERATED MALAY STATES,
KUALA LUMPUR,
21st January, 1926.

R. W. BLAIR,
*Chemist-in-Charge, Government Laboratories,
Federated Malay States.*

APPENDIX A.

TOTAL NUMBER OF SAMPLES EXAMINED IN THE CHEMICAL LABORATORY
DURING THE YEARS 1924 AND 1925.

							Number of Analyses, 1924.		Number of Analyses, 1925.
MEDICAL DEPARTMENT.—									
Milk, chemical	...	...	...	...	...	...	760	...	741
Milk, bacteriological	...	...	...	...	...	...	4	...	12
Condensed milk	...	...	...	...	...	...	3	...	Nil
Water, chemical	...	...	...	...	...	...	347	...	328
Water, bacteriological	...	...	...	...	...	...	41	...	36
Sewage effluents	...	...	...	...	...	...	15	...	26
Toddy	...	...	...	...	...	...	457	...	262
Toxicological analyses	...	...	...	...	...	...	30	...	24
Miscellaneous	...	...	...	...	...	...	15	...	27
TRADE AND CUSTOMS DEPARTMENT.—									
Liquors	...	...	...	...	...	...	114	...	138
Toddy	...	...	...	...	...	...	44	...	28
Chandu	...	...	...	...	...	...	353	...	400
Chandu dross	...	...	...	...	...	...	3,906	...	3,180
Deleterious drugs	...	...	...	...	...	...	Nil	...	24
Miscellaneous	...	...	...	...	...	...	23	...	28
POLICE DEPARTMENT.—									
Coins and coining materials	...	...	...	...	...	...	1,046	...	495
Articles for blood stains	...	...	...	...	...	...	80	...	107
Toxicological analyses	...	...	...	...	...	...	48	...	30
Liquors	...	...	...	...	...	...	9	...	5
Toddy	...	...	...	...	...	...	4	...	Nil
Deleterious drugs	...	...	...	...	...	...	3	...	2
Miscellaneous	...	...	...	...	...	...	34	...	12
OTHER DEPARTMENTS.—									
Miscellaneous	...	...	...	...	...	...	14	...	37
PRIVATE ANALYSES.—									
Water	...	...	...	...	...	...	11	...	34
Milk	...	...	...	...	...	...	1	...	12
Spirits	...	...	...	...	...	...	Nil	...	18
Toxicological analyses	...	...	...	...	...	...	1	...	1
Miscellaneous	...	...	...	...	...	...	5	...	14
Total							7,368	...	6,021

Chemical Averages for each month of the year 1925. Parts per 100,000 unless otherwise stated.

Month.	Impounding Reservoir. (Raw Water.)							Intake Works, Ampang. (Raw Water.)										
	Colour M. M. Brown.	p. H	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.	Rainfall in inches.	Colour M. M. Brown.	p. H	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.	Rainfall in inches.
January ...	21	7.5	.0006	.0090	.1345	.07	3.5	.004	8.16	33	7.0	.0008	.0105	.3052	.06	4.5	.004	6.76
February ...	23	7.5	.0005	.0097	.1493	.06	4.5	.006	9.37	28	7.5	.0009	.0058	.1538	.06	3.2	.006	10.96
March ...	22	7.0	.0005	.0104	.1531	.07	6.5	.003	17.65	29	7.5	.0009	.0071	.2031	.07	5.0	.006	12.03
April ...	26	7.0	.0005	.0108	.1518	.07	4.7	.006	16.61	32	7.5	.0005	.0069	.1710	.07	4.2	.006	18.65
May ...	24	7.5	.0006	.0108	.1404	.07	2.7	.003	6.53	23	7.5	.0008	.0052	.1131	.06	4.0	.006	8.28
June ...	27	7.0	.0003	.0107	.1405	.07	4.0	.004	8.43	27	7.0	.0002	.0054	.1358	.06	4.5	.006	10.69
July ...	26	7.5	.0003	.0099	.1439	.07	6.0	.004	5.97	32	7.0	.0002	.0098	.2828	.06	4.7	.008	3.70
August ...	25	8.0	.0005	.0099	.1611	.07	3.7	.003	6.16	21	7.5	.0004	.0053	.1361	.06	4.2	.004	7.03
September ...	26	8.0	.0003	.0110	.1711	.07	6.0	.002	11.39	23	7.5	.0000	.0051	.1525	.06	4.0	.006	9.59
October ...	34	7.5	.0007	.0106	.1688	.07	4.0	.002	13.43	28	7.0	.0000	.0064	.1464	.06	4.7	.010	14.00
November ...	30	7.5	.0006	.0108	.1518	.07	5.0	.002	26.39	32	7.0	.0005	.0073	.1681	.06	4.0	.004	29.49
December ...	25	6.5	.0008	.0090	.1147	.07	3.7	.006	8.29	17	7.0	.0007	.0051	.0828	.06	3.5	.006	13.68
Averages ...	26	7.5	.0005	.0102	.1484	.07	4.5	.004	11.53	27	7.5	.0005	.0066	.1709	.06	4.2	.006	12.07

Month.	Maxwell's Hill Reservoir. (Filtered Water.)							Weld Hill Reservoir. (Filtered Water.)								
	Colour M. M. Brown.	p. H	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.	Colour M. M. Brown.	p. H	Ammoniacal nitrogen.	Albuminoid nitrogen.	Oxygen absorbed in 3 hrs.	Chlorine.	Total solids.	Oxidized nitrogen.
January ...	19	7.0	.0002	.0058	.0870	.07	3.0	.008	25	8.0	.0002	.0041	.1001	.06	4.0	.007
February ...	20	7.5	.0007	.0079	.1050	.06	4.2	.006	25	8.0	.0000	.0046	.1327	.06	3.2	.008
March ...	20	8.0	.0001	.0081	.1071	.07	5.0	.004	24	8.0	.0000	.0047	.1221	.07	4.5	.006
April ...	25	8.0	.0000	.0087	.1122	.07	5.0	.004	28	8.0	.0002	.0045	.1213	.07	4.0	.008
May ...	20	6.0	.0000	.0037	.0620	.06	3.2	.006	23	8.0	.0002	.0042	.0870	.06	4.7	.003
June ...	17	6.0	.0000	.0057	.0811	.07	4.0	.003	23	8.0	.0000	.0043	.0947	.06	3.0	.006
July ...	19	6.0	.0000	.0044	.0683	.07	4.7	.004	21	8.5	.0002	.0044	.0913	.06	4.7	.006
August ...	16	6.5	.0000	.0051	.0933	.07	3.7	.004	18	8.0	.0000	.0039	.1051	.06	4.0	.005
September ...	16	6.5	.0000	.0037	.0758	.07	4.0	.006	20	8.0	.0000	.0044	.1326	.06	4.2	.006
October ...	23	6.5	.0002	.0053	.0995	.06	4.5	.004	24	8.0	.0002	.0047	.1194	.06	4.5	.004
November ...	19	6.5	.0005	.0041	.0715	.07	3.5	.004	23	7.5	.0000	.0046	.0898	.06	3.5	.004
December ...	13	6.5	.0000	.0043	.0569	.07	3.0	.008	18	8.0	.0000	.0039	.0681	.06	3.2	.008
Averages ...	19	7.0	.0001	.0056	.0850	.07	4.0	.005	23	8.0	.0001	.0044	.1054	.06	4.0	.006

REPORT OF THE SENIOR HEALTH OFFICER, FEDERATED MALAY STATES, FOR THE YEAR 1925.

HEALTH STAFF.

1. The sanctioned staff for the year was :

EUROPEAN OFFICERS.

Senior Health Officer ...	...	...	...	...	...	...	1
Health Officers ...	...	...	...	...	...	...	15
Chief Sanitary Inspectors ...	...	...	...	...	...	...	3

ASIATIC OFFICERS.

Assistant Health Officers ...	...	...	...	...	...	...	4
Sanitary Inspectors ...	...	...	...	...	...	...	28

2. As in former years there was not a sufficiency of Health Officers to fill the various posts and the work was carried on with what assistance the Medical Branch could afford to lend. In several instances dearth of officers made it necessary for one individual to be in charge of two posts.

3. Of the three Chief Sanitary Inspectors only one was available, the others being either on leave or seconded for duty with Sanitary Boards.

4. Eight of the Sanitary Inspectors were absent in Singapore undergoing a six months course preparatory to taking the examination for the Royal Sanitary Institute certificate which certificate must be held before an Inspector can be promoted to the higher grades. Their services were not available to the Branch from May until November.

5. The following table shows the principal changes among the senior staff :

Date.	Name of officer.	Designation.	From which district.	To which district.	Remarks.
13-4	R. P. Bliss ...	Medical Officer	Seremban ...	—	Reverted to Medical Branch
19-4	E. H. Black ..	Health Officer	—	—	Acted as Health Officer, Selangor East, in addition to Health Officer, Kuala Lumpur
21-4	V. D. Wyborn ...	Medical Officer	Selangor East	Pahang ...	—
24-4	W. O. Pou ...	Health Officer	Pahang ...	—	On long leave
13-5	F. V. Jacques ...	Medical Officer	Kinta ...	—	"
14-9	A. R. Wellington	Senior Health Officer	—	—	To Japan as Government delegate to the F.E.A.T.M. Congress and League of Nations Interchange of Health Officers
14-9	A. K. Cosgrave, M.C.	Senior Medical Officer, Selangor	—	Senior Health Office	—
5-11	C. S. Ryles ...	Health Officer	—	Selangor East	Recruit
6-11	W. J. Moir, O.B.E.	Health Officer	—	Kinta ...	Returned from leave
9-11	J. P. Fitzpatrick	Medical Officer	Kinta ...	—	Reverted to Medical Branch

6. The Federated Malay States Medical Enquiry Committee, which was appointed in 1925 by His Excellency the High Commissioner to enquire into the organisation and working of the Medical Department and which went thoroughly into the question of the duties of the Health Branch, were of opinion that "the division needs both strengthening and regrading."

They recommended a staff consisting of—

- 1 Chief Health Officer, Federated Malay States;
- 3 Senior Health Officers;
- 22 Health Officers, of which half at least should possess the D.P.H.
- 8 European Chief Sanitary Inspectors;
- 10 Reliable men of the Assistant Surgeons Class.

DUTIES OF THE HEALTH BRANCH.

7. This year, for the first time, the duties and responsibilities of the Senior Health Officer and of the Health Officers were defined in General Orders. Previous to their issue it was often difficult to fix responsibility and to determine procedure.

8. The duties of the members of the Health Branch include :

- (i) Vital statistics and work under the Registration of Births and Deaths Enactment;
- (ii) Malaria investigation and mosquito control;
- (iii) Work under the following Enactments :
 - (a) Quarantine and Prevention of Disease Enactment;
 - (b) Sanitary Boards Enactment;
 - (c) Sale of Food and Drugs Enactment;
 - (d) Labour Code;
- (iv) General, including inspection of schools, Government lines, water-works, etc.;
- (v) Maternity and Infant Welfare.

REVENUE AND EXPENDITURE.

9. The only revenue collected was that for certificates issued under the Registration of Births and Deaths Registration Enactment and for the sale of mosquito identification books. The sum collected was \$2,365.

10. The expenditure debited against the Health Branch was :

Personal emoluments	...	...	...	...	...	\$174,846.77
Temporary allowances	...	...	...	...	...	28,909.00
Other charges, annually recurrent	...	...	...	...	...	94,029.00
Other charges, special expenditure	...	...	...	...	...	393.00
						<hr/>
						\$298,177.77
Clerical Service	...	...	...	...	...	41,279.00
						<hr/>
Total						\$339,456.77

GENERAL REVIEW OF WORK DONE.

11. Again this year I have to report that paucity of staff and frequent changes made it impossible to carry out in full all the duties pertaining to the Branch, and much had to be left undone which otherwise would have been accomplished.

12. The amount of routine work at headquarters made it necessary for the Senior Health Officer (in the absence of a personal assistant) to spend almost the whole of his time in Kuala Lumpur and there was little opportunity for visiting out stations either for conferences or for inspections.

13. Work under the Registration of Births and Deaths Enactment in so far as registration is concerned was up to date. There was little time for working out details concerning the various causes of deaths, for compiling accurate vital statistics or for the preparation of graphs, all of which would form a very important part of a Health Officer's duties under normal circumstances.

14. Work in connection with malaria and mosquito destruction was carried on as efficiently as circumstances permitted. Neither teaching nor investigation could however be given that amount of attention which their importance merited.

15. The Senior Health Officer acted as Malaria Research Officer in addition to his own duties during the period May 1st to September the 13th.

16. Under the Quarantine and Prevention of Disease Enactment work was shared with the Medical Branch. There were no epidemics of great magnitude.

17. Under the Sanitary Boards Enactment work was chiefly done by Sanitary Inspectors under the supervision of the Chairman, Sanitary Boards, the Health Officer acting as adviser. Under the new General Orders it is laid down that the Health Officer "shall be responsible to the Sanitary Board for the carrying out of its policy in so far as the activities of the Chief Sanitary Inspectors and Sanitary Inspectors are concerned and shall direct the energies of those officers."

18. Under the Sale of Food and Drugs Enactment little action was taken—as want of staff and pressure of other duties prevented proper attention being given to this important subject.

19. Work under the Labour Code suffered from lack of staff. Of the 1,434 estates 609 only were visited by the Health Officer, and mines were not visited at all. The reports from the various districts show that out of 168 estate hospitals only 164 were visited.

20. School inspection is shared with the Medical Branch. Only 187 visits of inspection were made by the Health Staff.

HEALTH LEGISLATION.

21. No laws affecting the Public Health were passed during 1925.

VITAL STATISTICS.

22. Populations are estimated from the Census figures which are believed to be correct. Immigration and emigration have a greater influence on population than have births and deaths. Accurate information concerning immigration and emigration especially by rail are not available and tables cannot be given.

23. Increase in population is calculated on the arithmetical increase basis as experience has shown this to be more reliable than that based on geometrical grounds.

24. Births and deaths figures are obtained from notifications compulsory under the Registration of Births and Deaths Enactment which is everywhere in force. The total number of births and deaths is approximately correct. The accuracy of diagnoses as to causes of deaths is in the majority of cases open to question, for few of the cases were seen by a qualified medical man previous to decease. In each of the four large towns every uncertified body is viewed by the Assistant Health Officer who interrogates the friends and forms a diagnosis. In rural districts these duties are carried out by the Police.

25. Deaths in towns are debited against the town only if the deceased was resident there for three months or more previous to death. The towns contain hospitals which cater both for the town and the district surrounding it. It is a well-known fact that chronic cases from the rural areas drift to the towns in the hope of getting more skilled treatment. Taking all things into consideration even with a qualifying period of three months a number of deaths is debited against the towns which should be debited against the rural areas where the disease was contracted.

26. Assuming that the rate of population increase is the same as that during the intercensal period preceding and judging from the sickness and death returns furnished to the department the general health of the country continues to improve. The general death-rate was 23.60 per mille which is the lowest on record—that for 1924 was 23.68.

27. The number of deaths attributable to fevers (most of them probably of malarial origin) was 14,377 or 42.09 per cent. of the total. Last year the percentage was 42.53.

28. Dysentery and diarrhoea accounted for 5.69 per cent. of the total deaths, pulmonary tuberculosis for 5.86 per cent., pneumonia for 5.49 per cent. and convulsion for 11.44 per cent.

29. Because of the peculiar age and sex distribution and the fact that the labour of this country is largely males aged 20-45 who passed the doctor before embarking for Malaya, the death figures cannot be compared with countries where the labour is indigenous and where age and sex distribution are normal. With normal age and sex distribution the death-rate would probably be twice what it is.

30. There is however no getting away from the fact that the death-rates since 1911, when the Health Branch was first formed, have shown a steady decline.

31. The following figures are put up for comparison :

Year.	Federal.				Kuala Lumpur Town.				Estates.			
	General death rate.		Fevers death rate.		General death rate.		Fevers death rate.		General death rate.		Fevers death rate.	
1911	...	39.11	...	17.47	...	39.02	...	9.87	...	62.90	...	Not known
1925	...	23.60	...	9.93	...	15.31	...	1.46	...	11.95	...	3.28

32. The figures for estates must be accepted with caution for few Asiatic-owned estates ever admit either the existence of sickness or the occurrence of a death on the estate and nil returns are sent to the Health Officer.

VITAL STATISTICS (FEDERAL).

POPULATION.

33. The population of the Federated Malay States as estimated was at the end of June, 1925, 1,447,243, distributed as follows:

Perak	...	...	...	...	...	...	...	643,680
Selangor	...	...	...	...	...	...	...	446,473
Negri Sembilan	...	...	...	...	...	...	...	199,401
Pahang	...	...	...	...	...	...	...	157,689

34. Assuming that the races remain in the same proportion as in the Census year the race distribution is as follows:

State.	Europeans and Americans.	Eurasians.	Malays and other natives of the Archipelago.	Chinese.	Indians.	Others.
Perak	2,324	1,027	256,168	227,723	154,458	1,980
Selangor	2,943	1,741	103,192	179,093	157,398	2,106
Negri Sembilan	1,103	542	81,007	75,510	40,207	1,032
Pahang	338	129	108,696	38,276	9,576	674
Total	6,708	3,439	549,063	520,602	361,639	5,792

BIRTHS.

35. Forty-one thousand eight hundred and eighteen births were registered during the year, giving a birth-rate of 28.89 per mille of population. In 1924 the number was 39,512 and the rate was 27.86.

The following table shows the number of births and birth-rates according to races:

Race.	No. of births.	Birth-rate.
Europeans and Americans	139	20.72
Eurasians	101	29.37
Malays and other races of the Archipelago ...	20,056	36.53
Chinese	12,291	23.61
Indians	9,163	25.34
Others	68	11.74

DEATHS.

36. Thirty-four thousand one hundred and fifty-three deaths were registered, giving a death-rate of 23.60 per mille. The number of deaths in 1924 was 33,585 and the rate was 23.68.

The distribution of deaths among the several races was as follows:

Race.	No. of deaths.	Death-rate.
Europeans and Americans	27	4.03
Eurasians	36	10.47
Malays and other races of the Archipelago ...	12,541	20.28
Chinese	12,560	24.13
Indians	8,863	24.51
Others	126	21.75

37. The deaths and death-rates for the total population for the last ten years were as follows:

Year.	Population.	Deaths.	Rate per mille.
1916	1,208,177	36,985	30.60
1917	1,244,018	42,514	34.17
* 1918	1,279,859	67,639	52.85
1919	1,315,700	38,645	29.37
1920	1,351,541	43,705	32.34
1921	1,304,825	38,077	29.18
1922	1,360,876	35,028	25.74
1923	1,389,667	33,914	24.40
1924	1,418,455	33,585	23.68
1925	1,447,243	34,153	23.60

* High figure due to influenza epidemic.

38. Table showing causes of deaths in 1925:

Diseases.					No. of deaths.		Rate per mille.	
Malaria	14,377	...	9.93
Dysentery and diarrhoea	1,945	...	1.34
Pneumonia	1,877	...	1.30
Pulmonary tuberculosis	2,001	...	1.38
Ankylostomiasis	259	...	0.18
Beri-beri	424	...	0.29
Syphilis	98	...	0.07
Enteric	32	...	0.02
Tetanus	113	...	0.08
Convulsions	3,906	...	2.70
Bright's disease	203	...	0.14
Ptomaine poisoning	129	...	0.09
Influenza	72	...	0.05
Other diseases	8,717	...	6.02

39. The following table shows the deaths and death-rates from the principal diseases for the last ten years:

Year.		Malaria.		Dysentery and diarrhoea.		Pulmonary tuberculosis.		Beri-beri.	
		Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.
1916	...	17,627	14.58	3,197	2.64	2,193	1.81	757	0.62
1917	...	18,750	15.07	4,942	3.97	2,446	1.96	1,207	0.97
* 1918	...	31,515	24.62	4,280	3.34	3,184	2.48	1,277	0.98
1919	...	16,975	12.90	3,712	2.82	2,445	1.86	930	0.71
1920	...	20,595	15.24	3,804	2.81	2,634	1.95	431	0.32
1921	...	17,168	13.16	2,999	2.30	2,255	1.73	422	0.32
1922	...	15,570	11.44	2,419	1.78	2,393	1.76	443	0.33
1923	...	15,516	11.17	2,142	1.55	1,934	1.39	378	0.27
1924	...	14,283	10.07	1,961	1.38	1,916	1.35	453	0.32
1925	...	14,377	9.93	1,945	1.34	2,001	1.38	424	0.29

40.—

VITAL STATISTICS (*State figures for comparison*).*Birth Table.*

State.			No. of birth.		Birth-rate per 1,000 living.		1924 birth-rate.	
Perak	17,868	...	27.76	...	27.61
Selangor	13,256	...	29.69	...	27.23
Negri Sembilan	5,522	...	27.69	...	27.23
Pahang	5,172	...	32.80	...	31.39

41. Birth statistics of different nationalities:

State.				Europeans and Americans.		Eurasians.		Malays and other races of the Archipelago.		Chinese.		Indians.		Others.	
				Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.	Births.	Birth-rate.
Perak	...	...	...	60	25.82	22	21.42	8,834	34.49	5,511	24.20	3,396	21.99	45	22.73
Selangor	...	...	...	74	25.14	54	31.02	3,992	38.69	4,485	25.04	4,635	29.45	16	7.60
Negri Sembilan	...	...	...	4	3.63	23	42.44	3,220	39.75	1,365	18.08	906	22.53	4	3.88
Pahang	...	...	...	1	2.96	2	15.50	4,010	36.89	930	24.30	226	23.60	3	4.45

* Influenza epidemic year.

42.—

DEATH TABLE (*State figures for comparison*).

State.			No. of deaths.			Death-rate, 1925.			Death-rate, 1924.		
Perak	15,359	...	23.86	...	23.32	...	23.32	...
Selangor	10,159	...	22.75	...	21.50	...	21.50	...
Negri Sembilan	4,688	...	23.51	...	25.10	...	25.10	...
Pahang	3,947	...	25.03	...	29.45	...	29.45	...

43. Deaths and death-rates of different nationalities :

State.			Europeans and Americans.		Eurasians.		Malays and other races of the Archipelago.		Chinese.		Indians.		Others.	
			Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.	Deaths.	Death-rate.
Perak	...	...	8	3.44	11	10.71	5,714	22.31	5,858	25.72	3,713	24.04	55	27.78
Selangor	...	...	14	4.76	15	8.62	2,194	21.26	4,284	23.92	3,592	22.82	60	28.49
Negri Sembilan	...	...	4	3.63	10	18.45	1,983	24.48	1,451	19.22	1,236	30.74	4	3.88
Pahang	...	...	1	2.96	...	...	2,650	24.38	967	25.26	322	33.63	7	10.39

44. Table showing deaths and death-rates from principal diseases :

State.			Malaria.			Dysentery and diarrhoea.			Pulmonary tuberculosis.			Beri-beri.		
			Deaths.	Rate.		Deaths.	Rate.		Deaths.	Rate.		Deaths.	Rate.	
				1925.	1924.		1925.	1924.		1925.	1924.		1925.	1924.
Perak	...	...	7,154	11.11	10.66	745	1.16	1.20	957	1.49	1.50	86	0.13	0.15
Selangor	...	...	3,602	8.07	7.40	737	1.65	1.67	537	1.20	1.36	152	0.34	0.32
Negri Sembilan	...	...	1,743	8.74	10.50	250	1.25	1.32	329	1.65	1.52	77	0.39	0.67
Pahang	...	...	1,878	11.91	14.59	213	1.35	1.41	178	1.13	0.50	109	0.69	0.57

INFANTILE MORTALITY.

45. There were 7,409 deaths of children under one year of age. The infantile mortality rate or rate per 1,000 births was 177.17; the rate for 1924 was 180.53.

Infantile Mortality Table.

State.			Deaths of children under 1 year of age.			Death-rate per 1,000 births.		
Perak	2,964	...	165.88
Selangor	2,359	...	177.96
Negri Sembilan	1,108	...	200.65
Pahang	978	...	189.10

46. Deaths from zymotic diseases :

State.			Plague.		Cholera.		Smallpox.		Cerebro-spinal meningitis.	
Perak	—	...	1	...	9	...	2
Selangor	—	...	—	...	1	...	3
Negri Sembilan	—	...	—	...	—	...	1
Pahang	—	...	—	...	—	...	1

47. Death-rates from principal diseases for the last seven years :

Year.			Perak.			Selangor.			Negri Sembilan.			Pahang.		
			Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.
1919	...	...	13.45	2.21	1.83	10.23	3.59	2.39	17.15	4.77	1.39	13.22	1.27	1.01
1920	...	...	15.82	2.21	2.11	13.13	3.77	1.89	18.18	4.31	2.37	15.24	1.19	0.94
1921	...	...	13.32	1.54	1.78	11.80	3.29	1.85	13.07	3.42	1.68	16.61	1.19	1.18
1922	...	...	12.29	1.42	1.83	9.96	2.39	2.00	11.51	2.40	1.69	12.10	0.74	0.84
1923	...	...	12.46	1.26	1.52	9.48	1.93	1.48	10.53	1.45	1.41	11.36	1.73	0.58
1924	...	...	10.66	1.20	1.50	7.40	1.67	1.36	10.50	1.32	1.52	14.59	1.41	0.50
1925	...	...	11.11	1.16	1.49	8.07	1.65	1.20	8.74	1.25	1.65	11.91	1.35	1.13

48. Vital statistics for the four large towns, Kuala Lumpur, Ipoh, Taiping and Seremban :

Town.	Estimated population.	Births.		Deaths of persons who previous to decease had resided in town three months.	
		Number.	Rate per mille.	Number.	Rate per mille.
Kuala Lumpur	94,753	2,945	31.08	1,451	15.31
Ipoh	42,334	844	19.94	592	13.98
Taiping	21,780	990	45.45	634	29.11
Seremban	20,938	623	29.75	372	17.77

49. Table showing corrected death-rates in the four principal towns during the last seven years :

Year.	Kuala Lumpur.		Ipoh.		Seremban.		Taiping.	
	Population.	Death-rate.	Population.	Death-rate.	Population.	Death-rate.	Population.	Death-rate.
1919 ...	66,308	26.36	33,238	23.56	14,544	45.38	24,721	37.45
1920 ...	67,930	30.00	34,357	22.64	15,006	34.05	25,434	39.90
1921 ...	81,197	27.02	37,194	20.38	17,479	36.16	21,178	50.05
1922 ...	84,476	21.36	38,895	21.78	13,398	27.93	21,296	35.08
1923 ...	88,009	19.19	40,399	20.12	19,210	24.78	21,462	33.45
1924 ...	91,381	16.74	41,047	13.89	20,074	17.34	21,616	33.91
1925 ...	94,753	15.31	42,334	13.98	20,938	17.77	21,780	29.11

The death-rates for 1924 and 1925 were calculated on a three months' residence qualification basis, the years previous on a one month's qualification.

50. Table showing corrected deaths and death-rates from principal diseases :

Town.	Malaria.		Dysentery and diarrhoea.		Pulmonary tuberculosis.		Beri-beri.	
	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.	Deaths.	Rate.
Kuala Lumpur ...	138	1.46	108	1.14	166	1.75	22	0.23
Ipoh	75	1.77	28	0.66	64	1.51	7	0.17
Taiping	62	2.85	96	4.40	83	3.81	—	—
Seremban	54	2.58	34	1.62	57	2.72	7	0.33

51. Infantile Mortality Table :

Town.	Births.		Deaths under 1 year.		Rate per 1,000 births.
Kuala Lumpur	2,945	...	428	...	145.33
Ipoh	844	...	120	...	142.18
Seremban	623	...	101	...	162.12
Taiping	990	...	145	...	146.46

52. Table showing corrected death-rates for principal diseases in the four towns for the last seven years :

Year.	Kuala Lumpur.			Ipoh.			Seremban.			Taiping.		
	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.	Malaria.	Dysentery and diarrhoea.	Pulmonary tuberculosis.
1919	4.69	3.35	3.24	6.32	5.35	3.09	19.18	7.70	3.71	16.78	3.52	2.42
1920	5.08	2.49	3.48	5.64	2.64	3.75	8.99	5.00	3.40	19.14	2.99	1.57
1921	5.25	3.63	3.22	11.24	2.39	4.54	11.76	16.71	6.23	25.06	6.06	3.95
1922	2.79	2.18	3.33	4.50	1.62	2.54	10.44	5.92	6.35	5.45	1.50	1.74
1923	2.06	1.77	2.91	1.48	1.34	3.61	2.86	3.18	2.43	6.94	2.84	3.73
1924	1.13	1.53	2.66	0.97	1.00	1.51	2.89	1.54	1.89	5.41	2.91	3.47
1925	1.46	1.14	1.75	1.77	0.66	1.51	2.58	1.62	2.72	2.85	4.40	3.81

MOSQUITO-BORNE DISEASES.

53. The mosquito-borne diseases of Malaya are malaria, filariasis and dengue.
54. Filariasis as evidenced by elephantiasis, lymphangiectasis, orchitis, chyluria, etc., is comparatively rare in spite of the fact that the embryos of *filaria nocturna* are not infrequently found in the blood of natives.
55. Dengue is not a rare disease but being non-notifiable statistics concerning it are not available. The term dengue probably covers several fevers of different origins.

MALARIA AND ANTI-MALARIA MEASURES.

56. Viewing the Federation as a whole malaria still continues to head the list as the chief cause of sickness and of deaths.
57. Complete incidence figures are not available and reliance has to be placed on death notifications as a basis for computation.
58. In the hope of obtaining more accurate information, malaria was made notifiable in certain towns. The results have not been entirely satisfactory. Practically speaking the only persons who notified cases were Medical Practitioners and Medical Officers in charge of Hospitals. Not infrequently the information given on the notification card was so inaccurate as to serve no useful purpose and at times it was quite misleading. Every case notified was investigated with a view to ascertaining the source of the infecting anophelines.
59. The number of deaths registered during the year as due to fever was 14,377, giving a death-rate per mille population of 9.93 which is the lowest ever recorded.
60. A comparison of the malaria death-rates of the different States for 1924 and 1925 shows that there has been a slight increase in Perak and Selangor and a drop in Negri Sembilan and Pahang.
61. Compared with those of 1924 the malaria death-rates for the four large towns show an increase of 0.33 points for Kuala Lumpur, an increase of 0.80 for Ipoh, a drop of 0.31 for Seremban and a drop of 2.56 for Taiping.
62. Nothing occurred during the year to modify the opinion that malaria prevention by mosquito reduction is the right policy where persons are grouped together in towns, in villages and on estates.
63. The Malaria Advisory Board of which the Senior Health Officer is vice-chairman met regularly during the year and its minutes were published in the Press.
64. The Mosquito Destruction Boards continued to functionate and serve a useful purpose. A number of towns and villages formerly malarious are now free from the disease—Gemas once intensely unhealthy is now healthy.
65. The anti-malarial activities of the Health Branch included the teaching of mosquitology, propaganda, investigations and research, anti-mosquito measures and quinine distribution. These activities were carried out as far as time and circumstances permitted.
66. Several larvicides were experimented with including Paris green, cresol soaps, and oil obtained from the distillation of rubber. Taking all the facts into consideration, none was found to have any advantage over petroleum.
67. Tablets of quinine to the number of 460,000 were issued to the various Health Officers for ultimate free distribution to the public through the Police, the Education Department, and the District Officers also to the Senior Medical Officers for distribution through the various travelling dispensaries.
68. The Health Staff, the Malaria Research Staff and the Malaria Engineering Staff continued to work together in peace and harmony.

MEASURES TAKEN FOR PREVENTING THE INTRODUCTION AND SPREAD OF INFECTIOUS AND CONTAGIOUS DISEASES.

QUARANTINE AND PORT HEALTH WORK AT PORT SWETTENHAM.

69. During the year 45 ships with immigrant labourers were boarded and inspected. The labourers were landed at the Quarantine Camp. Of the 45 ships, 20 were infected—seven with chickenpox, five with smallpox and eight with cholera.
- S.S. "Takliwa" arrived at Port Swettenham direct from Negapatam seven times, and was infected with cholera three times.

70. The number of immigrants who entered the Quarantine Station, Port Swettenham, was 48,748, the number remaining on 31st December, 1924, was 781, making a total of 49,529. To this total should be added another eight which were admitted from the Dépôt for various diseases. The largest number on any one day was 3,975 on the 25th September, 1925.

71. The following table shows how these immigrants were distributed :

Discharged to Dépôt	...	...	...	...	...	47,867
Transferred to Klang Hospital	...	...	...	...	...	18
Absconded from the Quarantine Camp	...	...	...	...	...	38
Died in Hospital and Cholera Wards	...	...	...	...	...	206
Remaining on 31st December, 1925	...	...	...	...	...	1,408
Total						49,537

72. There were 206 deaths made up as follows :

Male adults	...	...	...	...	...	...	61
Female adults	...	...	...	...	...	...	13
Male minors	...	...	...	...	...	...	14
Female minors	...	...	...	...	...	...	27
Infants	...	...	...	...	...	...	91

The percentage of deaths to total arrived was 0.42 per cent.

73. The daily average of immigrants in the Camp was 1,257.78.

74. One thousand six hundred and twenty passengers were quarantined during the year.

75. Thirty thousand seven hundred and thirty immigrants received routine treatment for ankylostomiasis.

76. Forty-eight thousand four hundred and seventy-three immigrants, 1,585 passengers and 207 others were vaccinated, making a total of 50,265. Of these 10,073 failed to take.

77. The number of infectious cases were cholera 184, smallpox 7, chickenpox 10, measles 108, mumps 3, cerebro-spinal meningitis 3. With the exception of five smallpox cases from Bandar all came from ships or developed the disease while in the Camp.

78. The total number of persons removed from cholera infected ships was 11,369. Of these 184 either had the disease on admission or developed it while undergoing their period of quarantine. There were 63 deaths, the case mortality rate being 34.23 per cent.

CAMP HOSPITAL.

79. Fifty patients remained on the 31st December, 1925. Two thousand one hundred and sixty-nine were admitted during the year. Of the total treated 154 died, giving a percentage of 6.94 per cent. Pneumonia was responsible for 30 deaths, dysentery 21, broncho-pneumonia 71.

INFECTIOUS DISEASES OUTSIDE THE QUARANTINE CAMP.

80. The following table shows the cases of infectious diseases reported and the State in which they originated :

State.	Smallpox.		Cholera.		Plague.		Diphtheria.		Cerebro-spinal meningitis.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Perak ...	39	9	1	1	—	—	5	3	2	2
Selangor ...	6	1	—	—	—	—	25	4	5	3
Negri Sembilan...	2	—	—	—	—	—	5	2	1	1
Pahang ...	2	—	—	—	—	—	—	—	2	1
Total ...	49	10	1	1	—	—	35	9	10	7

81. There were 49 cases of smallpox and 10 deaths, of which 39 cases occurred in Perak, 6 in Selangor, 2 in Negri Sembilan and 2 in Pahang.

82. There was one fatal case of cholera reported from Perak. This was a passenger from India who developed the disease the day after he had been released from the Quarantine Camp, Pulau Jerejak.

83. There were no cases of plague reported.

84. Thirty-five cases of diphtheria were reported of which 25 were in Selangor, 5 in Perak and 5 in Negri Sembilan.

85. The figures for cerebro-spinal meningitis were 10 cases and 7 deaths. All were sporadic.

86. The number of deaths from dysentery and diarrhoea was 1,945, giving a death-rate of 1.34 per mille population, as against 1,961 and a death-rate of 1.38 per mille in 1924.

PULMONARY TUBERCULOSIS.

87. There were 2,001 deaths from pulmonary tuberculosis and the death-rate was 1.38 as against 1,916 and a death-rate of 1.35 in 1924.

88. With regard to the four States—Perak had a death-rate of 1.49 as against 1.50 in 1924, Selangor had 1.20 as compared with 1.36; Negri Sembilan had 1.65 as compared with 1.52 and Pahang had 1.13 as compared with 0.50.

89. With regard to the four large towns—Kuala Lumpur had a death-rate of 1.75 as compared with 2.66 in 1924; Ipoh 1.51 as compared with 1.51, Seremban 2.72 as compared with 1.89 and Taiping 3.81 as compared with 3.47.

HELMINTHIC DISEASES.

90. The only one of importance from a health point of view is ankylostomiasis. At least 90 per cent. of the native population harbour the worm in small numbers but few have sufficient to give rise to symptoms. All immigrants quarantined at Port Swettenham receive anti-ankylostome treatment.

SCAVENGING, NIGHT-SOIL DISPOSAL, DRAINAGE, ETC.

COLLECTION AND DISPOSAL OF REFUSE.

91. In most towns and villages under Sanitary Board control the scavenging is well done. Disposal is by incineration, dumping or the filling of swamps. The last two methods are apt to promote fly breeding.

COLLECTION AND DISPOSAL OF NIGHT-SOIL.

92. Up to date no town in the Federated Malay States has a water carriage system. There are a number of private installations working satisfactorily and their number is increasing. In Kuala Lumpur a small activated sludge plant is being constructed near the Institute of Medical Research. It is proposed to give this a thorough trial and to have the effluent frequently examined both chemically and bacteriologically and if it proves a success to employ the system in other parts of the town.

93. The system in use in most towns is the two-bucket system for the shop-houses and pit latrines for the bungalows standing in their own compounds. Most of these pit latrines form fly-breeding grounds and they are therefore unsatisfactory. Petroleum, lime and other larvicides have been used but unless applied lavishly do not prevent the breeding.

94. A number of bungalows are being provided with a septic tank system having an overflow into the surface drains. So far no nuisance has occurred and the system may therefore be described as satisfactory.

95. The ultimate disposal in the bucket system is by trenching. If not carefully watched it becomes short circuited to the Chinese vegetable gardens.

DRAINAGE.

96. Street drainage is controlled by the Sanitary Board authorities. Anti-malarial drainage is controlled by the Mosquito Destruction Boards. Many miles of sub-soil piping have been done by the anti-malaria branch of the Public Works Department.

CLEARANCE OF BUSH.

97. Clearance of bush is done on public lands by Sanitary Boards or Mosquito Destruction Boards. Clearance of bush in this country is not always a profitable proceeding for at the wet hill-foots it promotes the propagation of maculatus, the most powerful malaria carrier in Malaya. Many a healthy area has been rendered intensely malarial by the clearance of bush.

WATER SUPPLIES.

98. In the majority of cases towns are supplied with drinking water brought from uninhabited areas through pipes by gravitation. In some cases filters are employed, in others they are not considered necessary. Both slow and rapid filters are in use.

99. On estates conditions vary, some have excellent supplies, some are not so fortunate.

PUBLIC HEALTH EDUCATION.

100. The Public Health Education Committee met monthly during the year. Under its auspices pamphlets were prepared, lectures given and exhibitions arranged.

101. At the Horticultural Shows exhibitions were put up which were attended by thousands.

102. Popular lectures on malaria and other subjects are given at schools and kampongs.

SCHOOLS AND SCHOOL INSPECTION.

103. The numbers of Government and State Aided Schools in the Federated Malay States are as follows :

Government English Schools	...	...	...	...	...	13
Aided English Schools	...	...	...	...	...	30
Government Vernacular Schools	...	...	...	...	...	418
						<hr/> 461 <hr/>

Besides the above there is a considerable number of private schools.

104. The duties of school inspection were shared with the Medical Branch. Altogether 187 visits of inspection were made by the Health Staff.

105. Each school has a stock of Government quinine which is issued free of charge to those scholars who require it.

MATERNITY AND CHILD WELFARE.

106. The Infant Welfare Advisory Board met when necessary and its minutes were published.

107. Infant Welfare Centres have been established at Kuala Lumpur, Ipoh, Taiping and Seremban.

108. This year this work was transferred from the Medical Branch to the Health Branch.

109. All the Infant Welfare Centres are under the supervision of Lady Medical Officers and have specially trained European Infant Welfare Sisters. Each has a staff of Asiatic nurses who work part time at the Centre and part time on the district.

110. The Centres have become very popular and the work in connection with them is rapidly increasing.

111. There are two Maternity Hospitals which have been erected and maintained by the Chinese for the benefit of the poor of that nation. One is situated in Kuala Lumpur and the other in Ipoh. Both are very popular and are doing excellent work. At each there is a training school for midwives.

112. On many estates attention is paid to Maternity and Infant Welfare.

WORK UNDER THE LABOUR CODE.

113. The responsibility for the protection of health and the cure of disease lies with the employer of labour and it is his duty to engage the staff necessary for the purpose including a Medical Practitioner to advise in some cases to supervise in others.

114. It is the duty of the Health Branch to co-operate with the Labour Department with the object of ensuring a reasonable standard of sanitation where labour is concerned. In this sense the Health Officer is an auditor of sanitation and it is his duty to visit estates and bring to the notice of the Controller of Labour any defects in the arrangements required by law for the prevention or cure of disease.

115. Each estate should be visited at least twice a year but unfortunately owing to shortness of staff and pressure of other work many estates had to be left unvisited. The total number sending in returns is 1,434 and the total number of estate hospitals is 168.

116. A Bill called the Health Boards Enactment has been gazetted and will shortly come before the Federal Council. It provides machinery for the assessment of estates and mining lands for health purposes, and for carrying out recommendations of certain Boards with regard to health conditions.

ESTATES.

117. Details of the distribution of estates and estate hospitals and the frequency of visits by Health Officers are given below :

State.	Health district.	Estates.			Estate hospitals.		
		No.	No. of visits by H.O.		No.	No. of visits by H.O.	
			1925.	1924.		1925.	1924.
Perak ...	Perak North ...	258	48	83	25	19	27
	Kinta ...	139	57	37	6	10	5
Selangor ...	Perak South ...	242	116	120	24	23	37
	Selangor East ...	231	86	49	23	19	15
	Selangor Coast ...	169	130	121	34	36	31
Negri Sembilan ...	Bernam ...	4	6	1	2	2	—
	All districts...	292	131	134	45	40	45
Pahang ...	All districts...	99	35	142	9	15	19
Total, F.M.S. ...		1,434	609	687	168	164	179

Supplementary visits were paid by Sanitary Inspectors.

118. The distribution of labour was as follows :

				Indians.	Others.	Total.
Perak ...	Perak North ...	19,144	...	2,993	...	22,137
	Kinta ...	5,961	...	1,118	...	7,079
	Lower Perak and Batang Padang ...	19,765	...	2,131	...	21,896
Selangor ...	Kuala Lumpur, Ulu Selangor and Ulu Langat ...	16,541	...	4,199	...	20,740
	Coast ...	35,429	...	1,124	...	36,553
	Bernam ...	1,615	...	1	...	1,616
Negri Sembilan ...	All districts ...	17,988	...	11,583	...	29,571
Pahang ...	All districts ...	2,894	...	4,072	...	6,966
Total F.M.S. ...		119,337	...	27,221	...	146,558

119. The table below sets out the mortality rates among estate labourers during the past fifteen years, that is, since the Health Branch took over the supervision of health condition on estates :

Year.	Total number of estate labourers.			Deaths.	Death-rate per mille.
1911 ...	143,614	...	9,040	...	62.9
1912 ...	171,968	...	7,054	...	41.02
1913 ...	182,937	...	5,592	...	29.6
1914 ...	176,226	...	4,635	...	26.3
1915 ...	169,100	...	2,839	...	16.78
1916 ...	187,030	...	3,299	...	17.61
1917 ...	214,972	...	3,906	...	18.71
*1918 ...	213,425	...	9,081	...	42.55
1919 ...	216,573	...	3,384	...	15.16
1920 ...	235,156	...	4,367	...	18.57
1921 ...	175,649	...	3,195	...	18.19
1922 ...	159,279	...	2,556	...	16.05
1923 ...	147,276	...	1,924	...	13.06
1924 ...	144,902	...	1,514	...	10.45
1925 ...	146,558	...	1,585	...	10.81

* Influenza year.

120. There were 1,429 deaths among the 119,584 Indian estate labourers during the year, giving a mortality rate of 11.95 per mille as against 1,316 deaths and a death-rate of 11.40 in 1924.

121. Return of malaria admissions and deaths of Indian labourers and others in estates and Government Hospitals.

Divisions.	Malaria admissions to estates and Govt. hospitals.	Malaria deaths in estates and Govt. hospitals.	Total admissions to estates and Govt. hospitals.	Total labourers employed, all nationalities.	Total deaths.	Death-rate per mille.	Indians employed.	Deaths, Indian labour force.	Death-rate, Indian labour force.	Number of estates.	Number of hospitals.
Perak North ...	3,498	72	10,250	22,137	259	11.70	19,970	254	12.71	258	25
Kinta ...	878	25	2,471	7,079	42	5.93	5,961	40	6.71	139	6
Lower Perak and Batang Padang	3,287	68	11,476	21,896	186	8.49	19,765	179	9.05	242	24
Selangor East ...	3,194	53	9,039	20,740	184	8.87	16,541	176	10.64	231	23
Selangor Coast ...	4,269	125	15,356	36,553	376	10.29	34,850	374	10.73	169	34
Sabak Bernam ...	176	4	915	1,616	7	4.33	1,615	7	4.33	4	2
Negri Sembilan	4,116	105	12,471	29,571	421	14.24	17,988	342	19.01	292	45
Pahang ...	2,156	23	5,267	6,966	110	15.79	2,894	57	19.70	99	9
Total ...	21,574	475	67,245	146,558	1,585	10.81	119,584	1,429	11.95	1,434	168

MINES.

122. The average population engaged in mining during the year was 107,257 as against 106,479 in 1924 or an increase of 778 due probably to the high price of tin.

Mines are not required to send in sickness and death returns and the sick-rates and death-rates are not known.

Ten mines were visited by the Labour Department, but none was visited by the Health Branch.

KUALA LUMPUR,
3rd March, 1926.

A. R. WELLINGTON,
Senior Health Officer, F.M.S.

REPORT OF THE REGISTRAR-GENERAL OF BIRTHS AND DEATHS,
FEDERATED MALAY STATES, FOR THE YEAR 1925.

Reports received from the State Registrars indicate that the Registration of Births and Deaths in each State is up to date.

Several cases having been reported where loss of leaves or counterfoils had occurred in the office of a Deputy Registrar, action was taken to have a rule made requiring the Deputy Registrars to keep their registers and loose leaves under lock and key.

The leaves forming the Original Registers of Births and Deaths were received regularly and were bound in the office.

I attach a schedule of vital statistics.

KUALA LUMPUR,
17th March, 1926.

A. R. WELLINGTON,
Registrar-General of Births & Deaths, F.M.S.

FEDERATED MALAY STATES.

ESTIMATED POPULATION FOR 1925 OF ALL RACES OF EACH STATE AND FOR THE
WHOLE OF THE FEDERATED MALAY STATES.

States.	Europeans and Americans.	Eurasians.	Malays and other natives of the Archipelago.	Chinese.	Indians.	Others.	Total.
Perak	2,324	1,027	256,168	227,723	154,458	1,980	643,680
Selangor	2,943	1,741	103,192	179,093	157,398	2,106	446,473
Negri Sembilan	1,103	542	81,007	75,510	40,207	1,032	199,401
Pahang	338	129	108,696	38,276	9,576	674	157,689
Total, F.M.S. ...	6,708	3,439	549,063	520,602	361,639	5,792	1,447,243.

SUMMARY OF BIRTHS AND DEATHS FOR THE YEAR 1925.

BIRTHS.

States.	Europeans and Americans.	Eurasians.	Malays and other natives of the Archi- pelago.	Chinese.	Indians.	Others.	Total.	Rate per mille of popuia- tion.
Perak	60	22	8,834	5,511	3,396	45	17,868	27.76
Selangor	74	54	3,992	4,485	4,635	16	13,256	29.69
Negri Sembilan	4	23	3,220	1,365	906	4	5,522	27.69
Pahang	1	2	4,010	930	226	3	5,172	32.80
Total, F.M.S.	139	101	20,056	12,291	9,163	68	41,818	28.89

DEATHS.

Perak	8	11	5,714	5,858	3,713	55	15,359	23.86
Selangor	14	15	2,194	4,284	3,592	60	10,159	22.75
Negri Sembilan	4	10	1,983	1,451	1,236	4	4,688	23.51
Pahang	1	—	2,650	967	322	7	3,947	25.03
Total, F.M.S.	27	36	12,541	12,560	8,863	126	34,153	23.60

FEDERATED MALAY STATES.

RETURN OF DEATHS OF ALL AGES FROM PRINCIPAL DISEASES FOR 1925.

State.	Plague.	Cholera.	Smallpox.	Cerebro-spinal meningitis.	Diphtheria.	Typhus.	Yellow fever.	Malaria (including fever).	Blackwater fever.	Dysentery and diarrhoea.	Phthisis (pulmonary tuberculosis).	Pneumonia.	Beri-beri.	Enteric (typhoid).	Syphilis.	Ankylostomiasis.	Tetanus.	Cancer (including Sarcoma).	Bright's disease.	Influenza.	Potomaine poisoning.	Convulsions.	Deaths from other diseases.	Children under one year.	Persons between 20-40.	Persons over 60.	Persons of other ages.	Total.
Perak	9	1	3	...	...	7,154	...	745	957	665	86	15	44	126	40	3	22	25	40	1,541	3,883	2,964	3,456	1,967	6,972	15,359
Selangor	1	3	4	...	...	3,602	1	737	537	740	152	3	38	77	64	3	46	13	76	1,243	2,819	2,359	2,743	805	4,252	10,159
Negri Sembilan	1	2	...	...	1,743	1	250	329	343	77	10	13	40	5	7	128	29	9	627	1,074	1,108	1,187	475	1,918	4,688
Pahang	1	...	1	...	878	...	213	178	129	109	4	3	16	4	1	7	5	4	495	899	978	819	489	1,661	3,947
Total, F.M.S.	10	6	9	1	...	14,377	2	1,945	2,001	1,877	424	32	98	259	113	14	203	72	129	3,906	8,675	7,409	8,205	3,736	14,803	34,153

ANNUAL REPORT OF THE CHIEF SURGEON, PERAK.

The following represents the surgical work carried out at the District Hospital, Ipoh, during 1925:

Total surgical admissions to hospital	...	...	...	...	...	2,539
Total operations performed	...	...	...	...	...	911
Total major operations performed	...	...	...	...	...	212
Total minor operations performed	...	...	...	...	...	699

Mortality, 1925.—Total deaths following major operations were 33, making a percentage mortality of 15.2.

Regional classification of major surgical operations for 1925.

I. *Head and Neck.*—

Trephining skull (decompression)	...	...	...	...	...	5
„ frontal sinus	...	...	...	...	...	2
Heath's operation (mastoiditis)	...	...	...	...	...	4
Excision (tumour angle of jaw)	...	...	...	...	...	1
„ (tubercular glands of neck)	...	...	...	...	...	1
„ (sublingual ranula)	...	...	...	...	...	1
Hare lip	...	...	...	...	...	2
Cleft palate—repair	...	...	...	...	...	1
Removal of nasopharyngeal tumour by palate splitting operation with preliminary laryngotomy	...	...	...	...	...	1
Total	...	...	...	...	...	18

II. *Thorax.*—

Excision (keloid—chest wall)	...	...	...	...	...	1
Excision (epithelioma—back of chest)	...	...	...	...	...	1
Total	...	...	...	...	...	2

III. *Upper Limb.*—

Amputation (fingers)	...	...	...	...	...	4
„ (hand)	...	...	...	...	...	1
„ (arm)	...	...	...	...	...	2
Wiring—old ununited radius	...	...	...	...	...	1
Total	...	...	...	...	...	8

IV. *Lower Limb.*—

Skin grafting (leg)	...	...	...	...	...	1
Amputation (toes)	...	...	...	...	...	2
„ (leg)	...	...	...	...	...	6
Disarticulation (knee)	...	...	...	...	...	1
Excision—knee joint	...	...	...	...	...	1
„ fibroma foot and pedicle grafting	...	...	...	...	...	1
„ cyst of buttock	...	...	...	...	...	2
„ scaphoid (foot)	...	...	...	...	...	1
„ int. cuneiform	...	...	...	...	...	1
„ phalangeal joint	...	...	...	...	...	1
Drainage—suppurative arthritis of ankle	...	...	...	...	...	1
Ligaturing—ant. and post. tibials	...	...	...	...	...	1
„ femoral artery for aneurysm	...	...	...	...	...	1
Talipes equinus—lengthening tendo achilles	...	...	...	...	...	2
Femoral arterio—sympathectomy	...	...	...	...	...	1
Wiring (patella)	...	...	...	...	...	1
„ (tibia)	...	...	...	...	...	1
Plating (fractured femur)	...	...	...	...	...	1
Reduction—old dislocation of hip joint	...	...	...	...	...	1
Total	...	...	...	...	...	27

V. *Abdomen.*—

Herniotomy (inguinal)	29
„ (inguinal—strangulated with one resection of gut) ...	11
„ (femoral—strangulated with one resection) ...	2
„ (internal)	1
„ (ventral) repair	1
Cholecystostomy	4
Cholecystectomy	1
Liver abscess	1
Post. gastro-jejunostomy (including one with suture of perforation of chronic gastric ulcer)	7
Anterior gastro-jejunostomy	1
Suture perforated gastric ucler	1
„ gastric stab wound	1
Appendicectomy	10
Appendix abscess	3
Drainage operation (peritonitis)	7
Intestinal obstruction (bands and F.B.)	4
Volvulus (ileum and colon) one resection	2
Intussusception (with two resections)	4
Suture (traumatic-rupture of ileum)	1
Resection (gangrenous ileum)	1
Colostomy (intestinal obstruction)	2
Splenectomy (ruptured-traumatic)	1
Excision retroperitoneal fibroma	1
Excision fibroma of abdominal wall	1
Laparotomy (stab wounds)	2
Exploratory laparotomy	10
Femoral and ext. iliac aneurysm (ligaturing rt. common iliac artery)	1
Ligaturing internal iliac artery	1
Nephro-lithotomy	1
Supra pubic lithotomy	9
„ „ cystotomy	2
Hysterectomy (2 for rupture)	3
Cæsraean section	1
Excision (ovarian cysts) one including removal of pyosalpiux ...	6
„ (broad lig. cyst)	2
Broad ligament abscess	1
Ectopic gestation—tubal—one ruptured	3
Total ...	139

VII. *Perineum.*—

Amputation (penis)	3
Hydrocele (radical-operation)	7
Ext. urethrotomy (one for fistula)	2
Excision (papilloma of anus)	1
Hæmorrhoids (ligature operations)	3
Colporrhaphy	1
Excision (fibroma of vulva)	1
Total ...	18

Mr. C. B. Pasley proceeded on leave on November 19th and Mr. R. M. Dannatt acted as Chief Surgeon until the end of the year.

R. M. DANNATT,
Acting Chief Surgeon, Perak.

REPORT OF THE CHIEF SURGEON, SELANGOR.

Doctor T. W. H. Burne was acting as Chief Surgeon throughout the year.

The operations at the three hospitals were distributed as follows:

	Major.	Minor.	Totals.
General Hospital	152	450	602
European ,,	34	59	93
District ,,	71	183	254
	<u>257</u>	<u>692</u>	<u>949</u>

Besides the Chief Surgeon, the Medical Officers at the General Hospital and District Hospital have performed major operations, and in an emergency also the Assistant Medical Officer of the General Hospital.

The distinction between major and minor operations is a very arbitrary one and no comparison with other figures is possible unless the individual factor is the same, e.g., there were many more haemorrhoid operations performed than shown which were not of sufficient scope to be classified as "Major".

Anaesthetics for major operations were as follows:

	General.	Spinal.	Local.
General Hospital	133	14	5
European ,,	32	1	1
District ,,	65	4	2

Interesting Cases.—A woman with sufficient signs of "acute abdomen" to warrant exploration was found to have masses of round worms tightly packed in the small intestine.

A rare case is the full-term ectopic. This patient came into hospital several times with sub-acute obstruction and always refused operation. On the last admission only was the diagnosis clear. This time she begged for operation which was done as a forlorn hope with a fatal issue.

Two ovarian cysts were found to contain pus although they were not of the dermoid variety. One was so intimately adherent that it could only be drained, but the other, although intraligamentous, was completely removed.

A denture impacted in the oesophagus was removed successfully by lateral oesophagotomy. A temporary fistula resulted

A case of appendicitis in an inguinal hernia in a Malay boy, age 5, was thought of sufficient interest to be reported in a Medical Journal. The diagnosis before operation was that of strangulated hernia, but no sign was found that the appendix (the only contents) had ever been constricted.

The two Cæsarian sections delivered living children. One was undertaken for lateral placenta praevia and the other for dystocia due to fibroids.

The treatment of malignant disease is very disappointing since the Asiatics seldom apply for treatment in the operable stage.

T. W. H. BURNE.

SYNOPSIS OF MAJOR OPERATIONS.

Conditions and Operation.	General Hospital.		European Hospital.		District Hospital.	
	Total.	Deaths.	Total.	Deaths.	Total.	Deaths.
<i>Abdominal.</i> —						
Injuries chiefly stab wounds ...	12	5	—	—	—	—
Appendicitis	3	—	13	—	1	—
Appendicitis with gangrene ...	4	1	—	—	—	—
„ „ abscess ...	2	1	4	—	1	—
Retrocolic abscess ? Cause	1	—	—	—	1	—
„ „ foreign body	1	—	—	—	—	—
Gastrojejunostomy for pyloric stenosis	6	—	—	—	2	—

Conditions and Operations.	General Hospital.		European Hospital.		District Hospital.	
	Total.	Deaths.	Total.	Deaths.	Total.	Deaths.
<i>Abdominal—(cont.)</i>						
Gastrojejunostomy for perforation	1	—	—	—	—	—
Perforation—suture of	—	—	—	—	3	3
General peritonitis, gastric	3	1	—	—	1	1
General peritonitis, appendical	1	—	—	—	—	—
General peritonitis, strangulation	1	1	—	—	—	—
General Peritonitis, ? Cause	—	—	—	—	2	2
Anastomosis for faecal fistula	2	1	—	—	—	—
„ „ intussusception	1	1	—	—	—	—
Anastomosis for gangrene of bowel	—	—	—	—	1	1
Cholecystectomy	2	—	—	—	—	—
Cholecyst—duodenostomy	1	1	—	—	—	—
Cholecystotomy	—	—	—	—	1	—
Colostomy	2	—	—	—	1	—
Liver abscess	2	—	—	—	2	—
Splenectomy	1	—	—	—	2	2
Rupture of spleen-suture	—	—	—	—	1	1
Obstruction from adhesions	1	—	—	—	1	—
„ „ round worms	1	—	—	—	—	—
Exploratory—inoperable carcinoma of some organ	1	1	—	—	2	2
Exploratory—nothing pathological	—	—	1	—	—	—
H e r n i a Inguinal, Kocher's operation	15	—	3	—	2	—
H e r n i a Inguinal, Bassini's operation	4	—	—	—	1	—
Hernia inguinal, strangulated	5	2	—	—	1	1
„ ventral	—	—	—	—	1	—
Volvulus	1	1	—	—	1	1
<i>Ano-Rectal.—</i>						
Haemorrhoids	2	—	1	—	2	—
Imperforate rectum—plastic	3	1	—	—	1	—
„ „ colostomy	1	1	—	—	—	—
Epithelioma of anus	1	(recurred)	—	—	—	—
<i>Gynaecological.—</i>						
Ruptured ectopic gestation	1	—	—	—	—	—
Ectopic gestation, full-term	1	1	—	—	—	—
Hysterectomy for fibroids	2	—	—	—	—	—
Ovariectomy	2	—	—	—	1	—
Purulent ovarian cyst, excision	1	—	—	—	—	—
„ „ „ drainage	1	—	—	—	—	—
Salpingectomy	1	—	—	—	—	—
Colporrhaphy	1	—	—	—	—	—
Perinorrhaphy	5	—	—	—	—	—
Vesico-vaginal fistula	2	—	—	—	—	—
Curettage for retained products	3	—	—	—	—	—
Cæsarian section	1	—	1	—	—	—
Pelvic peritonitis	—	—	—	—	2	1
Sarcoma of vagina	—	—	—	—	1	—

Conditions and Operations.	General Hospital.			European Hospital.			District Hospital.		
	Total.	Deaths.		Total.	Deaths.		Total.	Deaths.	
<i>Genito-Urinary.</i> —									
Vesical calculus, suprapubic ...	1	...	—	...	—	...	2	...	—
External urethrotomy ...	3	...	—	...	—	...	3	...	—
External urethrotomy with extravasation ...	—	...	—	...	—	...	1	...	1
Urethral vistula ...	1	...	—	...	—	...	—	...	—
Nephrotomy ...	—	...	—	...	1	...	—	...	—
Nephrectomy ...	—	...	—	...	1	...	—	...	—
Hydrocele ...	3	...	—	...	1	...	1	...	—
,, of cord ...	1	...	—	...	—	...	—	...	—
,, loculated ...	1	...	—	...	—	...	—	...	—
Haematocele ...	1	...	—	...	—	...	—	...	—
Elephantiasis of scrotum ...	—	...	—	...	—	...	1	...	—
Excision of testi-s ...	1	...	—	...	—	...	—	...	—
Ruptured bladder ...	—	...	—	...	1	1	—	...	—
Amputation of penis ...	—	...	—	...	—	...	2	...	—
Excision of malignant glands ...	—	...	—	...	—	...	2	...	—
<i>Head and Neck.</i> —									
Compound fracture of skull ...	6	...	3	...	—	...	4	...	2
Cleft palate ...	1	...	—	...	—	...	—	...	—
Mastoiditis—Heath's operations ...	3	...	—	...	—	...	2	...	1
Tracheotomy for foreign body ...	1	...	—	...	—	...	—	...	—
Cut throat ...	1	...	—	...	—	...	—	...	—
Parotid tumour ...	1	...	—	...	—	...	—	...	—
Naevus of face ...	1	...	—	...	—	...	—	...	—
Lateral oesophagotomy for impacted foreign body ...	—	...	—	...	—	...	1	...	—
Epithelioma of cheek ...	1	...	—	...	—	...	—	...	—
Excision of glands, cervical ...	1	...	—	...	—	...	2	...	—
<i>Limbs.</i> —									
Lacerated wounds ...	—	...	—	...	3	...	—	...	—
Amputation of leg ...	5	...	1	...	—	...	1	...	—
,, arm ...	2	...	—	...	—	...	3	...	1
,, foot ...	1	...	—	...	—	...	1	...	—
Osteotomy cuneiform for talipes ...	2	...	—	...	—	...	—	...	—
Osteotomy for exostosis after fracture ...	1	...	—	...	1	...	—	...	—
Plating, wiring or suturing fracture ...	3	...	—	...	—	...	1	...	1
Sequestrotomy ...	1	...	—	...	—	...	—	...	—
Arthrotomy, excision of synovial fringe ...	—	...	—	...	1	...	—	...	—
Nerve suture ...	1	...	—	...	—	...	—	...	—
Varicose veins ...	—	...	—	...	1	...	—	...	—
Haematoma of thigh, excision ...	1	...	—	...	—	...	—	...	—
Excision of knee ...	—	...	—	...	—	...	1	...	—
Sarcoma of muscle sheath ...	—	...	—	...	—	...	1	...	—
<i>Chest.</i> —									
Empyema excision of rib ...	2	...	1	...	—	...	3	...	2
Gynecomastia ...	1	...	—	...	—	...	2	...	—
Lipoma ...	1	...	—	...	—	...	—	...	—
Excision of glands axillary ...	1	...	1	...	—	...	—	...	—
Estlander's operation ...	—	...	—	...	—	...	1	...	1

ANNUAL REPORT OF THE CENTRAL MENTAL HOSPITAL,
TANJONG RAMBUTAN.

Sir,—I have the honour to forward herewith the fifteenth annual report of the Central Mental Hospital, that for the year 1925.

	Males.	Females.	Males.	Females.
2. There remained on December 31st,				
1924	1,032	228		
Admitted during 1925	448	138		
Discharged—Recovered	123	54		
Relieved	24	5		
Not improved	45	23		
Not insane	—	2		
Absconded	72	2		
Died	71	34		
Remaining on 31st December, 1925	—	—	1,145	306

Singapore.—

Remained on 31st December, 1924	120	110
Discharged during 1925	4	1
Died	1	2
Remaining on 31st December, 1925	—	115

Criminals.—

Remained on 31st December, 1924	75	2
Admitted during 1925	25	—
Discharged	9	2
Died	7	—
Absconded	1	—
Remaining on 31st December, 1925	—	83

Kedah.—

Remained on 31st December, 1924	95	23
Admitted during 1925	41	7
Discharged	11	1
Died	13	—
Absconded	8	—
Remaining on 31st December, 1925	—	104

Kelantan.—

Admitted during 1925	6	1
Discharged	1	—
Remaining on 31st December, 1925	—	5
Total remaining on 31st December, 1925	—	1,452
Percentage of recoveries... ..	31.38	
„ „ deaths on total treated ...	5.31	
„ „ „ daily average ...	7.1	

3. This shows an increase of 150 against 163 last year, and 150 in 1923, so that there is little variation in the steady increase. There was an increase in all classes save Singapore cases, which show a decrease of 5 males and 3 females, 8 in all. This decrease may be looked for annually now, as we no longer take Singapore patients. The criminals increased by 6, in spite of a decrease of 2 in the female criminals. It will be seen that we have now no female criminals. Last year the criminals showed an increase of only two, whereas in 1923 the increase was eight. Kedah patients increased by 15 (9 males and 6 females) against 22 last year and 12 the year before.

4. The first Kelantan patients made their appearance in 1925, seven having been admitted.

5. One point for congratulation is that the increase in Federated Malay States patients is less than either last year or the year before; the figure being 131 against 166 last year and 150 in 1923.

6. *Admissions.*—The total admissions for the year numbered 666 which is 62 more than 1923 and 52 more than last year, which itself was a record.

7. In the statistical tables I shall, as usual, deal only with Federated Malay States patients.

The Kedah patients however now come in under the same condition as the Federated Malay States ones, and might in reality be classed with them for statistical purposes.

8. The Federated Malay States admission totals 586 (448 males and 138 females) against 529 last year and 469 the year before.

9. The number of admissions appears to go up steadily year by year. This, with our reduced death-rate, accounts for the steady increase, while this year the reduced recovery rate tends to swell this increase.

10. The greatest number of admissions in any one month was in May when there were 63. The two months that show the next highest were July and August. The smallest number of admissions was in April when there were 29.

11. The districts which gave us our greatest number of patients were Kuala Lumpur (90), Ipoh (75), Taiping (40), and Seremban (36), all urban.

12. As regards the form of mental disorder on admission, primary dementia again holds first place, which it did last year, for the first time having displaced recent melancholia and recent mania. The two latter are again, as last year, second and third in the list, though a good deal below primary dementia. General paralysis of the insane has risen to third place, bracketed with recent mania, with 68 cases against 50 of confusional insanity which comes fifth.

13. I last year pointed out the alarming condition of affairs with regard to the increase in primary dementia, owing to the fact that it attacks young adults, and the fact that, even if a recovery is made—the possibility of which some deny—a recurrence is probable, with ultimate permanent residence in a mental hospital.

14. I would again sound a word of warning in this connection against too hasty education, and the system of cramming. We should remember when dealing with a people more or less new to education as we know it, and certainly new to Western education, that our own is not a thing merely dating from our grandfathers' days, but a slow steady process covering about 50 generations.

15. *Discharges*.—The total discharges (Federated Malay States patients) numbered 276, as against 232 last year and 225 in 1923. This large increase is due to the extraordinary number of discharges under bond, "not improved," which total 68 against 10 last year and 6 the previous year.

16. *Recoveries*, as distinct from discharges, number 177 against 201 last year, and 194 the year before.

The recovery rate too is down to only 31.38 against 37.99 last year and 41.36 the year before.

17. This is the lowest the recovery rate has been for years, and I cannot help but think that it is due to a great extent to the fact that for eight months of the year we were short of staff.

It is too much to expect that one European can possibly carry on a place the size of the Central Mental Hospital and that the place will not suffer; and, in addition, the man who attempts it must suffer.

18. Again the admission of incurable disease, general paralysis of the insane, senile dementia, secondary dementia, imbecility, etc., is increasing year by year, which of course tends to reduce the recovery rate.

19. *Aetiology*.—Looking at the aetiological table (table 4) we find "gastro intestinal system" at the head as usual with 144 appearances. Next comes syphilis with 112 appearances. Next comes "cardiovascular degeneration" which is shown 88 times. Alcohol appears 71 times against 38 last year.

20. Turning to a comparison with last year we find that "gastro intestinal system" heads the list as before, but syphilis has risen to second place from fifth, having displaced "haemopoietic system," "cardiovascular system" and "alcohol."

21. However, this is what I prophesied last year, when I said I expected to see an increase, when we were able to have Wassermann tests done on more cases. We have been able to get a great deal larger number of Wassermann's done, and, as a result, have had positive evidence of syphilis in a great many more cases.

22. "Cardiovascular degeneration" retains the third place. Alcohol now appears in the fourth place instead of the third but a more remarkable fact is the vast increase in the number of cases attributed to alcohol, almost twice as many as last year.

23. I may be accused of repeating myself year after year in my report, but I cannot help again pointing the increase in alcohol as a cause of mental disease, and stressing the fact that alcohol is taking the place of opium with the Chinese, and very much to their detriment. I must point out also that we shall have to guard against the crimes attributable to alcohol amongst the Chinese as a new danger to the community.

24. A remarkable fact in alcohol as a cause in this year's table is that it appears as a contributory cause in almost half the cases attributable to alcohol, whereas last year it appeared almost invariably as a primary cause.

25. Even so, syphilis and alcohol are the most potent causes, as they appear more often than not as primary causes, whereas "gastro intestinal system" is almost invariably shown as a contributory cause, as is "cardiovascular degeneration," which in its turn is as often as not due to syphilis or alcohol.

26. Before I leave the question of alcohol, I should like to point out that alcohol appeared as a cause in 43 Chinese cases and only 20 Tamil cases.

27. Turning to the less frequent causes we find puberty and adolescence (under the main head of "critical periods") returned in 50 cases—about three times as often as a secondary cause than as a primary—while prolonged mental stress appears 35 times.

28. The large number under these heads is remarkable when taken in combination with the large increase in primary dementia, and rather tends to bear out the remarks I made on the subject of primary dementia in para. 12. Malaria appears 43 times, which enables it to just about hold its own in the list of causes. Here again however we have a cause which is shown much more frequently as a secondary cause.

29. *Deaths.*—The total deaths number 128, giving a death-rate of 5.31 on total treated and 7.1 on daily average. This is the lowest death-rate on total treated we have ever had, being lower than last year's 5.96. In 1923, the figures were 6.89 and 9.36.

30. The principal causes of death were G.P.I. 42, phthisis 19 and dysentery 16, against phthisis 27, dysentery 17, and G.P.I. 15 in 1924.

31. The most remarkable figure here is the extraordinary increase of deaths from G.P.I. which are nearly three times as many as last year. In 1923 deaths from G.P.I. numbered 19. I am quite at a loss to explain the extraordinary increase in deaths from G.P.I., especially as in almost every case a post-mortem is done, and has been ever since the institution opened.

32. Phthisis has fallen from 22 in 1923 and 27 in 1924 to 19, so that at Tanjong Rambutan at least it cannot be said that phthisis is on the increase.

33. When it is remembered that mental patients are particularly prone to phthisis the number of deaths from phthisis is remarkably small, and makes one wonder how much is really in the outcry about the alarming increase in phthisis in the country.

34. I would point out in this connection that we had exactly the same number of patients in the phthisis ward on December 31st as we had on January 1st, although our total number is greatly in excess of what it was on January 1st, 1925. There was one death from chronic opium poisoning, the only one we have ever had.

35. *Suicides.*—I regret to say there was one case of suicide during the year—a case of hanging. The fact that the man hanged himself in spite of there being a special attendant told off to watch him will give an idea of the reliability of the attendants one has to work with.

36. *Fatalities.*—Fatalities, I regret to say, numbered seven, a very large number indeed, and, in fact the largest we have ever had. Five of these were the result of assault by other patients, and two the result of falls. In one case the patient climbed up the expanded metal and fell, fracturing the base of his skull.

In the other case a patient was running away from another patient, and tripped over a bed board, fell on the corner, and ruptured his spleen—a very large one.

37. It is hard to know what to do to prevent a certain number of cases of this sort, but I am inclined to think that with better attendants we would have fewer of them, though, I must say we have failed in every case to bring home negligence against the attendant.

38. *Abscondings.*—During the year 83 patients absconded. This is a very long list and larger than we have ever had, but, as I have before pointed out, I would rather have a long list of abscondings than know the patients were cooped up like prisoners.

39. Many of these absconders came back of their own accord, having only gone away for a walk from a farm. Others were caught by our own attendants, and others again were brought back by the Police, while others came in again as new cases on new certificates, and some we have never seen any more of.

40. Many of the abscondings I do not worry about, but far too large a proportion is due to neglect on the part of attendants, and in some cases the negligence has been so gross that only the Court could inflict adequate punishment, and I am glad to say that on the occasions when it was decided advisable to apply to the Court, the Court took the same view and inflicted a punishment more or less commensurate with the offence.

41. *Criminal*.—There were 25 criminal admissions during the year against 21 last year and 32 the year before. Eleven were discharged against 13 in 1924 and 16 the previous year. There was one escape.

42. The criminals showed much the same types as the ordinary patients.

43. In this connection I would like to point out that these criminals are a very heavy responsibility, and a source of considerable anxiety; a responsibility, moreover, which the Medical Superintendent and staff of the County Mental Hospitals have not to carry, as in the British Isles there are regular criminal asylums—special institutions—for these cases.

44. *Kedah*.—The admissions from Kedah numbered 48 (41 men and 7 women) against 64 in 1924 and 50 the previous year. The discharges were 12 against 27 last year and 16 in 1923. The deaths numbered 13 against 9 in 1924 and 14 in 1923.

45. The Kedah patients did not exhibit any features different from the other patients, and now come in under the Mental Disorders Enactment.

46. *New Buildings*.—The only new building handed over was a 40-bed female ward, built to replace an attap building put up with our own labour to accommodate 50 female patients from Singapore in 1923. So that it has taken two years to find permanent accommodation for these patients. The reason that a 40-bed is sufficient to accommodate these patients is that death has reduced the number in the years they have been waiting.

47. The first class ward has not yet been built, but the contract has been signed and the foundations dug. The money for the ward was available from January the 1st.

48. Year after year the building vote is cut down so that we are much behind-hand with our buildings.

49. Our farms, or at least five of them, are in a very bad state, being old buildings, some nearly 10 years old, built as temporary accommodation by our own labour.

50. The store and office are overcrowded to a fearful extent, and it is only owing to the fact that we scarcely ever use a single room that we can find a place to store our rice.

51. *Farms*.—There are now 12 farms accommodating 250 patients.

52. In the farms the patients live an almost absolutely free life. There is an attendant in charge of each farm who looks after the general welfare of the patients, sees that dangerous weapons are not left lying about when not in use, and directs the general work on the farm.

53. In each farm is a nucleus of chronics and demented, while there is continually passing through a stream of convalescent and recovering cases, who are preparing for their return to normal life outside.

54. A certain number of escapes takes place from these farms, but in the majority of cases it is only a matter of taking a walk on their own, and they usually return. As soon as patients are missed however they are reported as escapes, and thus tend to swell the list of abscondings.

55. However, as the healthy exercise, and healthy outdoor life is such a valuable aid to a return to health, it is worth risking a certain number of escapes, especially as these patients, if they do escape, do no harm.

56. In addition to the original object of the farms they continue to produce a large quantity of the food consumed, so that the farms, in addition to their value from a medical point of view, are a means of reducing the cost of maintenance. A glance at the list of products from the farms, and the amount of work done, will show how much the various activities mean in cost of upkeep of the institution.

57. A list of work done in the work rooms is also appended, and shows how valuable the various activities of the patients are to the institution in addition to the condition of the patients themselves.

58. *Anti-Malarial Work.*—The work of draining, filling and oiling has continued as before. The oiling as last year, is undertaken by the Mosquito Destruction Board, while the draining and filling is done by our own people.

59. The work at the Sungei Bulat goes steadily on, but was exceptionally slow this year, principally owing to the extraordinary amount of rain in the second part of the year. I think also that too long a stretch of invert was put in at a time, so that before the banks of the section in which these inverts were laid could be sloped and sodded, down came rain, and undercut the high bank which thus collapsed.

60. I have now commenced to do only a very short section at a time, and complete it before digging the next section to put in inverts, by this means there is less time for rain to undo the work before it has been made permanent.

61. Sub-soiling has as before been carried on, while we have made all our own pipes, ranging from two to eight inches in diameter.

62. The daily average of malaria cases was in patients .73 on cases and .66 on individuals, which is higher than last when the rate was .41 and .35 respectively. When comparing these figures the fact that the ground was water-logged for about three months must be borne in mind.

63. *Staff.*—I was on leave from 15th April, 1925, to 4th December, 1925, and Dr. Wilson, the Assistant Medical Superintendent, acted for me.

64. Mr. E. Mathieu was appointed Agricultural Officer on 15th September, 1925, being transferred from Kuala Kangsar.

65. Mrs. L. Phillips, Work Mistress, retired on 8th August, 1925, and was replaced by Mrs. Tan Paik Choon on 1st September, 1925.

66. The services of Miss Mary de Castro were dispensed with on 18th January, 1925, and Mrs. Sut Prem Kaur resigned on 1st June, 1925. They were replaced by Miss C. Ortega and Miss Tan Guat Beng appointed respectively on 1st April, 1925, and 1st September, 1925. Thus we lost both our nurses.

67. External Head Attendant, Loke Tung, was dismissed on 19th December, 1925, and the vacancy has not yet been filled.

68. The services of Probationer Dresser M. Navaretnam were dispensed with on 15th February, 1925. Probationer Dresser H. I. Mohamed was appointed on 13th March, 1925, and resigned on 19th April, 1925.

69. Probationer Dressers S. V. Suppiah and C. Mylvaganam were appointed on 16th February, 1925, and 19th April, 1925, respectively.

70. Deo Sarong was appointed fourth assistant head attendant on 1st February, 1925.

71. N. Sivagnanam, Clerk, Class I, was transferred on 11th November, 1925, and the place as chief clerk was taken over by V. Cumarasamy.

72. C. L. Marcus was transferred on 1st February, 1925, and Muhammad Darus took his place on 16th February, 1925.

73. Yeoh Koon Yong arrived here on 19th October, 1925, but his services were dispensed with on 1st November, 1925.

74. Kesari Rai, Head Attendant, sat for the final of the Nursing Certificate of the Royal Medico Psychological Association of Great Britain and Ireland on 26th November, 1925. The result is not yet known, but as far as one can judge he should certainly pass.

75. *Maintenance Rate.*—The maintenance rate is again down being \$172.96 per annum against \$174.23 last year, and \$176.88 for 1923.

76. *Amusements.*—The usual games, drafts, chess, dominoes, etc., were played by the patients in wards. Sunday walks were taken in the grounds, and a proportion of the patients extended their Sunday walks to the town. When circuses and travelling cinemas were in the town all the patients fit to go were taken. The gramophone still continues to give pleasure, but is beginning to show signs of senility. The sports were held in July and provided the usual days outing for patients and attendants. The cricket and football teams also continued to play matches, but were not as successful as usual. A cinema of our own would be a great boon to the patients.

77. In closing my report I should like to thank Government for its continual help and support.

I have the honour to be,

Sir,

Your obedient servant,

W. F. SAMUELS,

Medical Superintendent,

Central Mental Hospital, Tanjong Rambutan.

TABLE A.
GENERAL TABLE SHOWING THE MOVEMENT OF THE HOSPITAL POPULATION
DURING THE YEAR 1925.

	Certified patients.					
	M.	F.	Total.	M.	F.	Total.
On the hospital register, January 1st, 1925 ...	1,322	423	1,745			
Total cases admitted during the year ...	520	146	666			
Total cases under treatment during the year ...	...	...	...	1,842	569	2,411
Cases discharged or transferred during the year—						
Recovered ...	152	56	208			
Relieved ...	25	6	31			
Not improved ...	35	24	59			
Not insane ...	5	2	7			
Died during the year ...	92	36	128			
Absconded... ..	81	2	83			
Total cases discharged, transferred and died during the year... ..	...	...	...	390	126	516
On hospital register on December 31st, 1925 ...	...	...	...	1,452	443	1,895
Average daily number on the registers during the year ... ..	...	...	1,816.2			

TABLE B.
SHOWING THE FORM OF MENTAL DISORDER ON ADMISSIONS IN THE DIRECT
ADMISSIONS DURING THE YEAR 1925.

Forms of mental disorder.					Direct admissions.		
					M.	F.	Total.
Congenital or infantile mental deficiency or idiocy or imbecility occurring as early in life as it can be observed.	}	1. Intellectual—					
		(a) With epilepsy	1	...	1		
		(b) Without epilepsy	13	5	18		
		2. Moral					
Insanity occurring later in life.	{	1. Insanity with epilepsy	8	2	10		
		2. General paralyses of the insane	56	12	68		
		3. Insanity with grosser brain lesions	4	2	6		
		4. Acute delirium					
		5. Confusional insanity	34	16	50		
		6. Stupor	1	2	3		
		7. Primary dementia	131	21	152		
		8. Mania—					
		(a) Recent	63	5	68		
		(b) Chronic	1	18	19		
		(c) Recurrent	5	10	15		
		9. Melancholia—					
		(a) Recent	68	34	102		
		(b) Chronic ... ..	...	1	1	
		(c) Recurrent	2	...	2		
		10. Alternating insanity	9	...	9		
		11. Delusional insanity—					
		(a) Systematised					
		(b) Non-systematised	12	1	13		
		12. Volitional insanity—					
		(a) Impulse					
		(b) Obsession					
		(c) Doubt					
		13. Moral insanity					
		14. Dementia—					
		(a) Senile	23	9	32		
		(b) Secondary	17	...	17		
		15. Not insane					
Total ...			448	138	586		

PATIENTS DISCHARGED AS CURED IN THE YEAR 1925.

Form of mental disorder.	Males.	Female.	Total.
1. Intellectual—			
(a) With epilepsy			
(b) Without epilepsy			
2. Moral			
1. Insanity with epilepsy			
2. General paralyses of the insane			
3. Insanity with grosser brain lesions			
4. Acute delirium			
5. Confusional insanity	22	9	31
6. Stupor ... ..	...	1	1
7. Primary dementia	26	1	27
8. Mania—			
(a) Recent	28	12	40
(b) Chronic ... ..	...	1	1
(c) Recurrent	1	6	7
9. Melancholia—			
(a) Recent	30	21	51
(b) Chronic	1	1	2
(c) Recurrent	2	2	4
10. Alternating insanity	7	...	7
11. Delusional insanity—			
(a) Systematised			
(b) Non-systematised	6	...	6
12. Volitional insanity—			
(a) Impulse			
(b) Obsession			
(c) Doubt			
13. Moral insanity			
14. Dementia—			
(a) Senile			
(b) Secondary			
Total ...	123	54	177

AN ANALYSIS OF THE DISCHARGES AND TRANSFERS DURING THE YEAR 1925.

	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.
Discharges as recovered from—									
Direct admissions									
First attack cases	78	34	112						
Not first attack cases	22	5	27						
Cases unknown whether first attack or not	23	15	38						
Total from direct admissions	123	54	177						
From transfers—									
First attack cases									
Not first attack cases									
Cases unknown whether first attack or not									
Total from transfers									
Total discharged as recovered ... ..	...	...	...	123	54				
				Relieved.			Not improved.		
Discharged (not recovered) as—									
Relieved	24	5	29	24	5	29			
Not improved	45	23	68	...	...	...	45	23	68
Total	69	28	97						
Reasons for such discharges—									
To go to care of friends	67	28	95						
Statutory by irregularity in reception order									
Other reason (specifying them)—									
Total	67	28	95						
Transferred as—									
Relieved									
Not improved									
Total									
Destination of such transfers—									
To leper asylum	2	...	2						
To single care									
Other destinations (specifying such)—									
Total									
Total discharges and transfers as—									
Relieved ... ..	...	...	...	24	5	29			
Not improved ... ..	...	...	...	...	...	...	45	23	68

TABLE SHOWING THE FORM OF MENTAL DISORDER ON 31ST DECEMBER, 1925,
OF THOSE ON THE REGISTER AT THAT DATE.

Forms of mental disorder on 31st December.					M.	F.	Total.
Congenital or infantile mental deficiency (idiocy or imbecility) as occurring as early in life as it can be observed.	1. Intellectual—						
	(a) With epilepsy				8	1	9
	(b) Without epilepsy				27	12	39
	2. Moral						
Insanity occurring later in life.	1. Insanity with epilepsy				39	9	48
	2. General paralyzes of the insane ...				50	6	56
	3. Insanity with grosser brain lesions ...				9	3	12
	4. Acute delirium						
	5. Confusional insanity				50	21	71
	6. Stupor				5	5	10
	7. Primary dementia				266	52	318
	8. Mania—						
	(a) Recent				39	23	62
	(b) Chronic				37	3	40
	(c) Recurrent				10	7	17
	9. Melancholia—						
	(a) Recent				48	20	68
	(b) Chronic				62	23	85
	(c) Recurrent				8	2	10
	10. Alternating insanity				47	3	50
	11. Delusional insanity—						
	(a) Systematised				24	5	29
	(b) Non-systematised				26	2	28
	12. Volitional insanity—						
	(a) Impulse				4	...	4
	(b) Obsession ... ..				...	1	1
	(c) Doubt				1	...	1
	13. Moral insanity						
	14. Dementia—						
	(a) Senile				44	20	64
	(b) Secondary				341	88	429
	15. Not insane						
Total ...					1,145	306	1,451

Prospect of mental recovery ... { Favourable 271
Doubtful 576
Unfavourable 604

TABLE SHOWING THE FORM OF MENTAL DISORDER AND NATIONALITY ON ADMISSION
IN THE DIRECT ADMISSIONS DURING THE YEAR 1925.

Forms of mental disorder.		Males.						Females.						Totals.	
		Chinese.	Malays.	Tamils.	Javanese.	Eurasians.	Others.	Chinese.	Malays.	Tamils.	Javanese.	Eurasians.	Others.	Males.	Females.
Congenital or infantile mental deficiency (idiocy or imbecility) occurring as early in life as it can be observed.	1. Intellectual—														
	(a) With epilepsy...	...	...	1	...	...	...	...	...	...	...	...	...	1	
	(b) Without epilepsy	10	2	1	...	...	...	4	...	1	...	...	...	13	5
	2. Moral														
	Insanity with epilepsy ...	4	1	3	...	...	...	1	...	1	...	...	...	8	2
	General paralysis of the insane ...	46	7	1	...	...	2	11	...	...	1	...	...	56	12
	Insanity with grosser brain lesion ...	4	...	...	...	...	...	2	...	...	...	...	...	4	2
	Acute delirium														
	Confusional insanity ...	18	2	12	1	...	1	5	1	7	2	...	1	34	16
	Stupor ...	1	...	...	...	...	...	1	...	1	...	...	...	1	2
	Primary dementia ...	56	22	43	3	...	7	12	4	3	2	...	...	131	21
	Mania—														
	(a) Recent ...	29	10	22	...	...	2	11	6	6	...	...	...	63	23
	(b) Recurrent ...	2	1	2	...	...	...	6	1	3	...	...	...	5	10
	(c) Chronic ...	1	...	...	...	...	...	...	...	...	...	...	...	1	
	Melancholia—														
	(a) Recent ...	33	5	25	2	...	3	15	3	13	1	1	1	68	34
	(b) Recurrent ...	1	...	1	...	...	...	...	...	...	...	...	...	2	
	(c) Chronic ...	...	...	...	...	...	...	...	1	...	...	...	...	...	1
	Alternating insanity ...	3	3	3	...	...	...	...	...	...	...	...	...	9	
	Delusional insanity—														
	(a) Systematised ...														
	(b) Non-systematised ...	7	3	2	...	...	...	1	...	...	...	...	...	12	1
	Volitional insanity—														
	(a) Impulse ...														
	(b) Obsession ...														
	(c) Doubt ...														
	Moral insanity ...														
	Dementia—														
	(a) Senile ...	20	1	1	...	...	1	3	2	3	...	1	...	23	9
	(b) Secondary ...	11	1	3	...	...	2	...	...	...	...	...	...	17	
	Not insane														
	Totals ...	246	58	120	6	...	18	72	18	38	6	2	2	448	138

ANALYSES OF THE ADMISSIONS DURING THE YEAR 1925.

Classes of admissions.	Congenital.			Acquired.									Total.		
				First attack.			Not first attack.			Unknown whether first attack or not.					
	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.
Direct	2		2	320	121	441	60	13	73	66	4	70	448	138	586
Total admissions...	2		2	320	121	441	60	13	73	66	4	70	448	138	586

AGES.

Civil.	Year.	Less than 10 years of age.		10-14		15-19		20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-64		65-69		70-74		75-79		80-84		Totals.																															
		M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.																															
The ages at the commencement of present attack.																																																																	
1925	1	1	2	3	5	3	8	18	4	22	41	14	55	61	20	81	90	34	124	80	20	100	64	15	79	40	8	48	28	5	33	9	5	14	8	4	12	1	4	5	1	...	1	...	1	...	1	448	138	586															
1924	2	...	2	1	1	2	2	12	9	21	45	13	58	75	14	89	75	25	100	70	16	86	61	12	73	30	8	38	23	6	29	8	...	8	11	2	13	3	...	3	416	106	522																	
1923	1	...	1	3	2	5	2	15	7	22	35	12	47	50	16	66	66	25	91	70	19	89	44	9	53	11	7	18	11	6	17	5	...	5	4	...	4	1	1	2	1	...	1	...	1	318	104	422																	
1922	1	...	1	3	1	4	7	3	10	30	14	44	78	18	96	78	18	96	22	91	68	14	82	43	8	51	30	2	32	16	4	20	8	1	9	8	...	8	2	...	2	1	...	1	365	86	451																

The ages at the commencement of present attack.

SPECIFIC DISEASES WHICH CAUSED DEATH DURING THE YEAR 1925.

General paralysis of the insane	...	...	...	...	...	...	...	42
Dysentery	...	...	...	...	...	...	...	16
Phthisis	...	...	...	...	...	...	...	19
Malaria	...	...	...	...	...	...	...	6
Anterio sclenosis	...	...	...	...	...	...	...	4
Softening of the brain	...	...	...	...	...	...	...	4
Valvular disease of the heart	...	...	...	...	...	...	...	2
Pneumonia	...	...	...	...	...	...	...	5
Chronic Brights disease	...	...	...	...	...	...	...	1
Leprosy	...	...	...	...	...	...	...	1
Transverse myelitis	...	...	...	...	...	...	...	1
Pellagra	...	...	...	...	...	...	...	1
Tubercular peritonitis	...	...	...	...	...	...	...	2
Cerebral syphilis	...	...	...	...	...	...	...	1
Gumma of brain	...	...	...	...	...	...	...	1
Cancer of liver	...	...	...	...	...	...	...	2
Exhaustion from acute mania	...	...	...	...	...	...	...	1
Carcinoma of tonsils	...	...	...	...	...	...	...	1
Chronic nephritis	...	...	...	...	...	...	...	2
Abscess of spleen	...	...	...	...	...	...	...	1
Tabes mesenterica	...	...	...	...	...	...	...	1
Hepatic cirrhosis	...	...	...	...	...	...	...	1
Status epilepticus	...	...	...	...	...	...	...	1
Exhaustion from chronic opium poisoning	...	...	...	...	...	...	...	1
Ruptured liver and cerebral hæmorrhage	...	...	...	...	...	...	...	1
Aneurysm of descending aorta	...	...	...	...	...	...	...	1
Cerebral abscess following external injury	...	...	...	...	...	...	...	1
Accidents and suicides	...	...	...	...	...	...	...	8
Total								128

DISTRICT FROM WHICH PATIENTS WERE ADMITTED DURING 1925.

Ipoh	...	...	...	...	75	Kajang	...	...	...	...	5
Kuala Lumpur	...	...	...	...	90	Tanjong Malim	...	...	...	...	5
Taiping	...	...	...	...	40	Kuala Lipis	...	...	...	...	3
Seremban	...	...	...	...	36	Klian Intan	...	...	...	...	3
Klang	...	...	...	...	27	Rembau	...	...	...	...	1
Kuantan	...	...	...	...	21	Grik	...	...	...	...	5
Teluk Anson	...	...	...	...	20	Gemas	...	...	...	...	1
Parit Buntar	...	...	...	...	19	Gopeng	...	...	...	...	4
Kuala Kangsar	...	...	...	...	16	Salak North	...	...	...	...	2
Kampar	...	...	...	...	17	Enggor	...	...	...	...	2
Tapah	...	...	...	...	17	Batang Padang	...	...	...	...	5
Kuala Kubu	...	...	...	...	14	Port Dickson	...	...	...	...	3
Port Swettenham	...	...	...	...	12	Ayer Kuning North	...	...	...	...	1
Bagan Serai	...	...	...	...	10	Ulu Selangor	...	...	...	...	1
Tanjong Rambutan	...	...	...	...	9	Bidor	...	...	...	...	2
Kuala Pilah	...	...	...	...	9	Tampin	...	...	...	...	2
Parit	...	...	...	...	8	Pahang	...	...	...	...	3
Sitiawan	...	...	...	...	13	Mantin	...	...	...	...	2
Raub	...	...	...	...	7	Salak South	...	...	...	...	1
Sungei Siput	...	...	...	...	7	Batang Kali	...	...	...	...	1
Batu Gajah	...	...	...	...	4	Port Weld	...	...	...	...	1

DISTRICT FROM WHICH PATIENTS WERE ADMITTED DURING 1925—(cont.).

Bangi	1	Kamunting	2
Temerloh	3	Selama	4
Batang Malaka	1	Tanjong Karang	1
Kepong	2	Siputeh	6
Bruas	2	Bunting	1
Temoh	1	Lahat	3
Pulai	4	Ampang	5
Rawang	2	Sungkai	2
Kuala Kurau	3	Carey Island	1
Simpang Ampat	2	Pekan	3
Lenggong	2	Krian	1
Pondok Tanjong	2	Chemor	3
Bentong	5		
		Total ...	586

Building during 1925.—

Building No. 11 Donabate farm
 „ No. 12 Hillside „
 „ Theatre Hall
 „ Stable to Agricultural Officer

Rebuilding No. 4 Highfield

„ buffalo-shed
 „ shed for kiln.

Repairing.—

Extension shed (cattle) behind No. 6 ward
 Repairing shed where pipes are made
 Re-thatching motor-car shed
 „ to roof to No. 7 Leigh farm
 „ „ „ No. 9 cattle-shed
 „ „ „ No. 6 Moulton farm.

Bridges.—

Repairing bridge between Woodside and Grange Gorman farms
 „ „ Portrane and Grange Gorman farms
 „ 2 bridges beyond Moulton farm

Drains.—

Laying 268 cement inverts along Sungei Bulat, 536 feet long
 „ 167 sub-soil pipes 2" beyond stable of M.S.
 „ 170 „ 4" „ „
 „ 330 „ 4" inside the jungle near Moulton farm
 „ 616 „ 4" by the side of Sungei Bulat
 „ 395 „ 8" in Moulton farm
 „ 200 „ 4" „ „
 „ 247 „ 6" „ „
 „ 657 „ 2" by the side of road in the park from the bridge
 „ 228 „ 2" „ „ main drain in the park from the bridge
 „ 28 „ 4" under the bridge.

Excavating a drain 737 feet long by the side of Sungei Bulat.

FARM PRODUCE FOR 1925.

FARM PRODUCE FOR 1929.							\$	c.
Milk, fresh	...	...	...	...	...	8,086½ pints	...	1,694 40
Pork	...	...	...	...	...	11,245	...	4,160 65
Fowls (cleaned)	...	...	...	...	...	94.8	...	60 48
Eggs, hen	...	...	...	...	...	5,160	...	180 60
Curry-stuffs	...	...	...	...	...	1,021	...	204 20
Onions	...	...	...	...	...	136.10	...	16 40
Arrow root	...	...	...	...	...	85.14	...	45 80
Millet	...	...	...	...	...	952	...	76 16
Dholl, soya beans, green peas, etc.	...	...	...	...	...	270	...	21 60
Mealie meal	...	...	...	...	...	979	...	78 32
Paddy to fowls	...	...	...	...	...	1,844	...	88 58
Sweet potatoes	...	...	...	...	...	25,832	...	536 64
Sweet potatoes for pigs	...	...	...	...	...	150	...	1 50
Sweet potato leaves for pigs	...	...	...	...	...	12,000	...	60 00
Tapioca	...	...	...	...	...	8,268	...	205 36
Yams	...	...	...	...	...	400	...	28 00
Cocoanut	...	...	...	...	...	2,899	...	115 96
Gingelly oil	...	...	...	...	...	57.12	...	27 38
Cocoanut oil	...	...	...	...	...	47	...	12 22
Kachang oil	...	...	...	...	...	150	...	42 00
Oil cake	...	...	...	...	...	388.8	...	30 77
Cigars	...	...	...	...	...	3,700	...	12 33
Limes	...	...	...	...	...	168	...	3 36
Lime pickles	...	...	...	...	...	166	...	3 32
Bread fruit	...	...	...	...	...	6	...	1 20
Gooseberry	...	...	...	...	...	19	...	19
Bananas	...	...	...	...	...	520	...	780 00
Papayas	...	...	...	...	...	7,615	...	310 47
Pineapples	...	...	...	...	...	1,633	...	116 42
Mulberry	...	...	...	...	...	6.3	...	14 85
Custardapples	...	...	...	...	...	917	...	53 10
Rambutans	...	...	...	...	...	24,058	...	60 15
Bullock's hearts	...	...	...	...	...	42	...	2 10
Mangoes	...	...	...	...	...	225	...	32 71
Guavas	...	...	...	...	...	1,586	...	14 25
Jambu Ayer	...	...	...	...	...	2,724	...	13 62
Oranges	...	...	...	...	...	46	...	1 38
Soursop	...	...	...	...	...	153	...	14 66
Water melons	...	...	...	...	...	2	...	50
Jack fruits	...	...	...	...	...	302	...	151 00
Belimbings	...	...	...	...	...	37,028	...	185 14
Carombolas	...	...	...	...	...	4,434	...	22 17
Machangs	...	...	...	...	...	73	...	2 21
Chikus	...	...	...	...	...	2,656	...	26 56
Pomeloos	...	...	...	...	...	20	...	4 00
Buah susu	...	...	...	...	...	18	...	54
Buah salak	...	...	...	...	...	6,715	...	18 64
Grenadilla	...	...	...	...	...	64	...	3 20
Cashew nuts	...	...	...	...	...	249	...	1 25
Pitanji	...	...	...	...	...	1,893	...	8 44
Vegetables	...	...	...	...	...	274,557.6	...	16,828 45
Vegetables to Ipoh Hospital	...	...	...	...	...	2,080	...	127 40
Total							...	\$26,500 63
Firewood to kitchens, disinfectors, dhoby-sheds, infectious disease hospital, kiln, etc.							1,460 carts	18,980 00
Grand Total							...	\$45,480 63

Bamboo Works.—

						\$	c.	\$	c.
Baskets, washing rice	...	...	...	...	12	at	1 25	=	15 00
.. boiling fish	...	...	...	...	22	,,	90	=	19 80
.. shovels	...	...	...	...	443	,,	45	=	199 35
.. medicine	...	...	...	...	1	,,	—	=	—
.. with cover	...	...	...	...	10	,,	25	=	2 50
.. ration attendants	...	...	...	...	26	,,	15	=	3 90
.. vegetables	...	...	...	...	20	,,	1 00	=	20 00
.. carrying grass	...	...	...	...	30	,,	20	=	6 00
Bamboo hats, Chinese	...	...	...	...	275	,,	60	=	165 00
.. brooms	...	...	...	...	2,770	,,	22	=	609 40
.. sieves	...	...	...	...	4	,,	60	=	2 40
Coir brooms	...	...	...	...	11	,,	6	=	66
Hen coops	...	...	...	...	4	,,	40	=	1 60

Tailoring.—

Bajus, male patients	...	...	...	...	2,509	,,	13	=	326 17
Trousers	..	...	...	...	2,422	,,	12	=	290 64
.. attendants	...	...	...	...	185	,,	50	=	92 50
Shirts	..	...	...	...	183	,,	70	=	128 10
Sarong, female attendants	...	...	...	...	900	,,	15	=	135 00
Kebayahs	..	...	...	...	1,000	,,	35	=	350 00
Lock suit	...	...	...	...	14	,,	2 50	=	35 00
Canvas gloves	...	...	...	...	—		—	=	—
Bed stretcher cover, canvas	...	...	...	...	14	,,	1 25	=	17 50
Mosquito nets	...	...	...	...	46	,,	50	=	23 00
Pillow cases	...	...	...	...	180	,,	10	=	18 00
Pillows, coir	...	...	...	...	285	,,	10	=	28 50

Carpentering.—

Wooden benches	...	...	...	...	17	,,	2 00	=	34 00
Feeding pig trays	...	...	...	...	20	,,	1 00	=	20 00
Qualley covers, wooden	...	...	...	...	8	,,	80	=	6 40
Wooden boxes for minimax	...	...	...	...	1	,,	2 00	=	2 00
Cocoanut ladles	...	...	...	...	12	,,	10	=	1 20
Trolleys with trays	...	...	...	...	3	,,	10 00	=	30 00
Wooden rollers for m.m.m.	...	...	...	...	4	,,	4 00	=	16 00
Invert mould	...	...	...	...	2	,,	1 50	=	3 00
Bathing tins	...	...	...	...	39	,,	20	=	7 80
Wooden mallet	...	...	...	...	1	,,	50	=	50
.. mason trowels	...	...	...	...	2	,,	1 00	=	2 00
.. trays	...	...	...	...	17	,,	50	=	8 50
Tin scoops	...	...	...	...	34	,,	25	=	8 50

Mending.—

Female bajus	...	...	...	...	4,577	,,	5	=	228 85
.. sarongs	...	...	...	...	2,381	,,	10	=	238 10
Red blankets	...	...	...	...	308	,,	10	=	30 80
White blankets	...	...	...	...	591	,,	10	=	59 10
Attendants' kebaya's	...	...	...	...	170	,,	10	=	17 00
.. sarongs	...	...	...	...	89	,,	10	=	8 90
Red cotton belts	...	...	...	...	96	,,	5	=	4 80
Curtains	...	...	...	...	40	,,	25	=	10 00
Pillow cases	...	...	...	...	398	,,	3	=	11 94
Pillow cases	...	...	...	...	1,190	,,	3	=	35 70
Lock suits	...	...	...	...	28	,,	20	=	5 60
Children's clothing	...	...	...	...	65	,,	5	=	3 25
Male trousers	...	...	...	...	3,895	,,	5	=	194 75
Male bajus	...	...	...	...	4,682	,,	5	=	234 10

Miscellaneous.—

							\$	c.		\$	c.
Farm sign-boards	...	...	...	...	...	4 at	2	50	=	10	00
Boxes for dispensing	...	...	...	...	...	2 „		50	=	1	00
Coffins	...	...	...	...	...	53 „		60	=	31	80
Tombstones	...	...	...	...	...	53 „		25	=	13	25
Box for minimax	...	...	...	...	...	1 „		3 00	=	3	00
Doors to farm	...	...	...	...	...	4 prs. „		6 25	=	25	00
Door posts (farm)	...	...	...	...	...	3 prs. „		3 00	=	9	00
Door to farm kitchens	...	...	...	...	...	3 prs. „		1 00	=	3	00
Handle to grinding stones	...	...	...	...	...	1 „		50	=		50
Lid of incinerator	...	...	...	...	...	1 „		40	=		40

Daily works.—

Laying out, weeding and clearing land for planting foodstuffs.
 Drain clearing and scavenging.
 Sweeping and clearing grass.
 Carting firewood and rubbish.
 Gardening.
 Repairing and planting bamboo fence.
 Clearing roads and weeding in fields.
 Boundary clearing.
 Scything.
 Clearing overgrown on sides of drains.
 Filling and levelling up holes and swamps.
 Cutting firewood.
 Collecting fuel for kiln.
 Making clay pipes.

Repairing.—

Bullock-carts	...	...	...	...	...	6 at	3	00	=	18	00
Handcarts	...	...	...	...	...	9 „		2 00	=	18	00
Meal trolleys	...	...	...	...	...	33 „		3 00	=	99	00
Bedboards	...	...	...	...	...	56 „		1 00	=	56	00
Benches	...	...	...	...	...	119 „		1 00	=	119	00
Teatubs	...	...	...	...	...	4 „		80	=	3	20
Meal trays	...	...	...	...	...	68 „		2 00	=	136	00
Chairs	...	...	...	...	...	2 „		2 00	=	4	00
Currystuff pounder	...	...	...	...	...	2 „		1 00	=	2	00
Sledges	...	...	...	...	...	2 „		5 00	=	10	00
Grass cutter machine box	...	...	...	...	...	1 „		1 00	=	1	00
Meal tables	...	...	...	...	...	3 „		3 00	=	9	00
Bed boards for attendants	...	...	...	...	...	1 „		3 50	=	3	50
Farm name boards	...	...	...	...	...	1 „		20	=		20

AETIOLOGICAL.

Showing the aetiological factors and associated conditions assigned in the direct admissions during the year 1925, distinguished between cases—congenital, first attack, not first attack and unknown whether first attack or not.

Aetiological factors and associated conditions.		Congenital cases.										First attack cases.										Not first attack cases.							
		Principal.		Contributory.		Total incidence.						Principal.		Contributory.		Total incidence.						Principal.		Contributory.		Total incidence.			
		Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.	Instances where regarded as the essential or chief factor.	Instances where regarded as a contributory or associated condition.				
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
		M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
A.—Hereditary (excluding cousins, nephews, nieces and offspring)—																													
1. Insane ...		1	...	1	...	...	...	1	...	1	3	2	5	...	...	...	3	2	5	1	...	1	...	...	...	1	...	...	1
2. Epileptic ...																													
3. Neurotic [including only hysteria, neuresthenia, spasmodic (idiopathic), asthma and chorea] ...																													
4. Eccentricity ...																													
5. Alcoholism ...																													
B.—Mental instability, as revealed by—																													
1. Moral deficiency ...																													
2. Congenital mental defect, not amounting to imbecility ...																													
3. Eccentricity ...																													
C.—Deprivation of special sense—																													
1. Smell or taste...																													
2. Hearing ...																													
3. Sight ...																													
D.—Critical periods—																													
1. Puberty and adolescence ...											4	8	12	26	4	30	30	12	42	...	1	...	...	...	...	1	...	...	1
2. Climacteric ...										2	2	...	2	1	3	4	3	3	6	...	...	...	2	...	2	2	...	...	2
3. Sensibility ...										2	2	4	6	3	...	3	5	1	6	...	...	...	2	1	3	4	1	...	5
E.—Child-bearing—																													
1. Pregnancy ...												1	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
2. Puerperal state (not septic) ...												2	2	...	...	...	...	2	2	...	...	...	...	...	...	...	...	...	...
3. Lactation ...												1	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
F.—Mental stress—																													
1. Sudden ...											...	...	...	2	2	4	2	2	4	...	1	1	3	...	3	3	1	...	4
2. Prolonged ...											2	2	4	11	13	24	13	15	28	...	...	...	...	...	...	...	...	...	...

G.—Physiologica defects and errors—																								
1. Malnutrition in early life (signs of rickets, etc.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Privation and starvation	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Over-exertion (physical)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Masturbation	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Sexual excess	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
H.—Toxic—																								
1. Alcohol	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Drug habit (morphia, cocaine, etc.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Lead and other such poisons	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Tuberculosis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Influenza	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Pueral sepsis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7. Other specific fevers	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8. Syphilis, acquired	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9. Syphilis, congenital	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10. Other toxins, malaria	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I.—Traumatic—																								
1. Injuries	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Operations	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Sunstroke	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
J.—Diseases and nervous system—																								
1. Lesions of brain	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Lesions of spinal cord and nerves	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Epilepsy	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Other defined neuroses (limited to hysteria, neurasthenia, spasmodic asthma and chorea)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Other neuroses which occurred in infancy or childhood limited to the convulsions and night terrors	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
K.—Other bodily affections—																								
1. Haemopoietic system (anæmia, etc.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Cardiovascular degeneration	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Valvular heart disease	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Respiratory system (excluding tuberculosis)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Gastro intestinal system	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Renal and vesical system	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7. Generative system (excluding syphilis)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8. Other general affections not included above (e.g., diabetes, myxodema, etc.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
L.—Cases in which no principal factor could with certainty be assigned, but in which one or more factors were ascertained and were returned as contributory																								
M.—None assignable, notwithstanding full history and observation																								
N.—None ascertained, history defective																								
Totals	2	...	2	Total congenital cases=2					320	121	441	Total first attack cases=441					60	13	73	Total not first attack case =73				

AETIOLOGICAL—(cont.).

Showing the aetiological factors and associated conditions assigned in the direct admissions during the year 1925, distinguished between cases—congenital, first attack, not first attack and unknown whether first attack or not—(cont.).

Aetiological factors and associated conditions.	Cases unknown whether first attack or not.										Total direct admissions.												
	Principal.					Contributory.					Total incidence.					Principal.		Contributory.				Grand total incidence.	
	Instances where regarded as the essential or chief factor.		Instances where regarded as a contributory or associated condition.			Instances where regarded as the essential or chief factor.		Instances where regarded as a contributory or associated condition.			Instances where regarded as the essential or chief factor.		Instances where regarded as a contributory or associated condition.										
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46					
A.—Hereditary (excluding cousins, nephew, nieces and offspring)—																							
1. Insane ... ..	...	...	...	...	...	...	...	...	...	5	2	7	...	...	...	5	2	7	T.
2. Epileptic ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
3. Neurotic [including only hysteria, neurasthenia, spasmodic (idiopathis), asthma and chorea]	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
4. Eccentricity ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T.
5. Alcoholism ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
B.—Mental instability, as revealed by—																			M.				
1. Moral deficiency ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T.
2. Congenital mental defect, not amounting to imbecility	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
3. Eccentricity ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
C.—Deprivation of special sense—																			T.				
1. Smell or taste ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
2. Hearing ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
3. Sight ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T.
D.—Critical periods—																			F.				
1. Puberty and adolescence ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
2. Climactic ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T.
3. Sensibility ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
E.—Child-bearing—																			M.				
1. Pregnancy ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T.
2. Puerperal state (not septic)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
3. Lactation ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
F.—Mental stress—																			T.				
1. Sudden ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
2. Prolonged ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.

G.—Physiologica defects and errors—														
1. Malnutrition in early life (signs of rickets, etc.)	...	...	...	...	...	...	...	...	...	...	...	...	1	1
2. Privation and starvation ...	...	...	...	...	...	...	...	...	...	...	...	...	8	71
3. Over-exertion (physical) ...	...	...	...	...	...	...	...	...	...	...	...	...	6	6
4. Masturbation ...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
5. Sexual excess ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
H.—Toxic—														
1. Alcohol ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Drug habit (morphia, cocaine, etc.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Lead and other such poisons ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Tuberculosis ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Influenza ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Pueral sepsis ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7. Other specific fevers ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8. Syphilis, acquired ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9. Syphilis, congenital ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10. Other toxins, malarial ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I.—Traumatic—														
1. Injuries ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Operations ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Sunstroke ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
J.—Diseases and nervous system—														
1. Lesions of brain ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Lesions of spinal cord and nerves	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Epilepsy ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Other defined neuroses (limited to hysteria, neurasthenia, spasmodic asthma and chorea)...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Other neuroses which occurred in infancy or childhood limited to the convulsions and night terrors	...	...	...	...	...	...	...	...	...	...	...	...	...	...
K.—Other bodily affections—														
1. Hemopoietic system (anæmia, etc.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Cardiovascular degeneration ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Valvular heart disease ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Respiratory system (excluding tuberculosis)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Gastro intestinal system ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Renal and vesical system	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7. Generative system (excluding syphilis)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8. Other general affections not included above (e.g., diabetes, myxodema, etc.) ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
L.—Cases in which no principal factor could with certainty be assigned, but in which one or more factors were ascertained and were returned as contributory ...														
M.—None assignable, notwithstanding full history and observation ...														
N.—None ascertained, history defective ...														
Totals ...	66	4	70	Total cases unknown whether first attack or not=70							448	138	Total direct admissions=586	

ANNUAL REPORT OF THE WORK DONE IN COMBATING VENEREAL DISEASES IN THE FEDERATED MALAY STATES, 1925.

A scheme for combating venereal diseases was submitted to Government towards the middle of the year. The scheme was placed under the following headings:

Education;
Staff;
Treatment Centres.

EDUCATION.

- (a) The subordinate staff of the Medical Department.
(b) General Public.

(a) EDUCATION OF THE SUBORDINATE STAFF OF THE MEDICAL DEPARTMENT.

Professional education of the Assistant Surgeons and Dressers has been carried out during the year; practically the whole of the subordinate staff, Perak, Negri Sembilan and Selangor received a course of instruction in venereal diseases; judging by the results of the recent examination this course proved useful.

(b) GENERAL PUBLIC.

Education of the public as to the incidence, and dangers of venereal diseases and the extra importance of not contracting them, with this object in view a series of lantern lectures has been delivered in the under-mentioned clubs, etc. Propaganda by this method has given satisfactory results. This is shown by increased attendance at the Sultan Street Clinic.

In addition to these lectures, pamphlets are distributed and posters placarded in public places.

Education of the public is also continually being carried out in the clinics, Sultan Street and District Hospital, and venereal disease wards, District Hospital. Patients are made to understand the dangers of venereal diseases and the importance of early and continued treatment. It is gratifying to note that many bring their friends for treatment. Propaganda by this means will extend when other treatment centres are opened. The clinic is not only a treatment centre but a centre for the education of the infected and of healthy persons.

LECTURES.

Date.	To whom lectured and place.					No. of attendance.		Time.
SELANGOR.								
KUALA LUMPUR.								
12-8-25	...	Malays of the Police Dépôt	...	...	...	250	...	9.30 p.m.
13-8-25	...	Indians of the Police Dépôt	...	...	...	300	...	9.30 „
15-9-25	...	Health Union (Chinese Merchants Club)	...	...	...	50	...	6.30 „
16-9-25	...	Selangor Chinese Atheletic Union	...	...	...	60	...	6.30 „
18-9-25	...	Indians at Central Police Station	...	...	...	100	...	3.00 „
2-10-25	...	Chong Ngah Club, Sultan Street	...	...	...	40	...	6.30 „
31-10-25	...	Chinese Young Men's Society, Davidson Road	...	...	...	270	...	9.00 „
2-11-25	...	V.I. Old Boys' Association, Roger Street	...	...	...	60	...	6.30 „
4-11-25	...	Selangor Chinese Recreation Club	...	...	...	80	...	6.30 „
6-11-25	...	Selangor Rompers Club	...	...	...	70	...	6.30 „
10-11-25	...	Young Men's Christian Association	...	...	...	65	...	7.00 „
PERAK.								
IPOH.								
18-11-25	...	English-speaking people in general at the Chinese Perak Dramatic Club	...	...	...	250	...	6.30 „
TAIPING.								
19-10-25	...	Chinese Club	...	...	...	65	...	6.30 „
20-10-25	...	Malays and Government servants at Town Hall	...	...	...	100	...	7.00 „
TAPAH.								
23-9-25	...	Malays and Indians	...	...	...	60	...	7.00 „
24-9-25	...	Chinese Club	...	...	...	70	...	7.00 „
NEGRI SEMBILAN.								
SEREMBAN.								
6-10-25	...	Clerks and English-speaking Chinese at Chinese Miners' Association	...	...	...	50	...	6.30 „
7-10-25	...	Chinese at the Chinese Miners' Association	...	...	...	40	...	6.30 „

STAFF.

Seven Assistant Surgeons, 16 Dressers and 6 Nurses have been asked for in 1926.

TREATMENT CENTRES.

- (1) Main Treatment Centres.
- (2) Sub-treatment Centres.

(1) MAIN TREATMENT CENTRES.

Six main treatment centres for Federated Malay States have been suggested:

- (1) Kuala Lumpur.
- (2) Ipoh.
- (3) Seremban.
- (4) Taiping.
- (5) Klang.
- (6) Eventually, Kuala Lipis.

Kuala Lumpur.—Venereal diseases were first treated on an organised scale in the District Hospital, Kuala Lumpur, during 1923, a small clinic was also established there at the same time. This soon proved of value, many patients of all nationalities seeking treatment. In July, 1924, two shop-houses were rented in Sultan Street, Kuala Lumpur, at \$100 a month each, a part of one being converted into a Town Dispensary, the remainder and the other house for treating venereal diseases. Both these institutions soon proved their value as will be seen by the following returns.

Two thousand three hundred and twenty-eight patients were treated for venereal diseases and 29,335 received treatment for other diseases in the Town Dispensary.

Ipoh.—The present Infant Welfare Centre will be vacated soon and this will be converted into a Venereal Disease Clinic.

Seremban.—The present Town Dispensary has been altered to allow first, second and third class venereal disease patients being treated there.

Taiping.—The Town Dispensary has also been altered to allow venereal disease cases being treated.

Klang.—The Town Dispensary is in no way suitable for treating venereal disease cases as it consists of only one room. This precluded the possibility of making Klang one of the main treatment centres during 1925.

(2) SUB-TREATMENT CENTRES.

By this is meant the smaller towns such as Kajang, Tapah, etc., and outstation dispensaries. These sub-centres need not be equipped so fully as the main centres and their duties would be to treat only the straight forward cases of gonorrhoea and syphilis. Difficult complications would be sent into the main centres which would be fully equipped with the latest and up-to-date instruments necessary to deal with these complications and also any cases which need skilled treatment, as the main centres would be staffed with officers specially trained for this work.

SULTAN STREET VENEREAL DISEASE TREATMENT CENTRE, KUALA LUMPUR.

During the year 1925, 2,328 patients of both sex received treatment. The following table shows nationalities and diseases:

Nationalities.	Syphilis.	Per cent.	Gonorrhoea.	Per cent.	Soft sore.	Per cent.	Total.
Chinese	... 1,017	... 67.9	... 300	... 20.0	... 179	... 11.2	... 1,496
Tamils	... 141	... 35.4	... 197	... 49.4	... 60	... 15.0	... 398
Malays	... 50	... 52.0	... 37	... 38.5	... 9	... 9.0	... 96
Sikhs	... 98	... 56.9	... 55	... 31.9	... 19	... 11.0	... 172
Eurasians	... 9	... 27.2	... 17	... 51.5	... 7	... 21.2	... 33
Europeans	... 7	... 8.3	... 71	... 84.5	... 6	... 7.1	... 84
Others	... 25	... 51.0	... 19	... 38.7	... 5	... 10.2	... 49
Total	... 1,347	... 57.8	... 696	... 29.4	... 285	... 12.2	... 2,328

2. It will be seen from this table that the Chinese are the heaviest sufferers from syphilis and Europeans from gonorrhoea.

3. The number of Europeans attending has greatly increased during the second half year.

4. Out of the total treated 1,993 were males and 335 females.

5. Twenty-seven prostitutes suspected of having venereal diseases were examined. All were found to be suffering from gonorrhoea or syphilis and in some cases from both diseases.

On two occasions brothel keepers in Sungei Besi and Ampang were prosecuted for having infected girls in their brothels; convictions being obtained in each case.

6. It will be seen from the second graph, during October the largest number of patients attended.

A continual rise has taken place during the year except for the drop which occurred in April.

7. The following table shows details of work done:

Irrigations	...	...	...	...	...	...	5,377
Prostatic massages	...	...	...	...	...	...	400
Passing sounds	...	...	...	...	...	...	265
Urethroscopic examinations	...	...	...	...	...	...	73
Arsenical Injections	{ Novarsenobillon						3,461
	{ Stabilarsan						179
Mercury injections	...	...	...	...	...	...	3,015
Bismostab injections	...	...	...	...	...	...	625
Sulfarsenol injections	...	...	...	...	...	...	185
Wassermann blood test	...	...	...	...	...	...	424
Microscopic examinations	...	...	...	...	...	...	1,106

STAFF.

8. Venereal Disease Specialist	...	...	...	...	...	Dr. E. A. Smith
Assistant Surgeon	...	...	...	...	...	Mr. G. H. Oorloff
Nurse	...	...	...	...	...	Mrs. V. M. de Lile
Dresser, Grade II	...	...	...	...	...	Mr. A. Sinnappu
Laboratory Dresser, Grade II	...	...	...	...	...	Mr. Alvainar
Dispenser, Grade II	...	...	...	...	...	Mr. Teh Tai Seng
Attendant (Male)	...	...	...	...	...	Wee Ah Lok
„ ( „ )	...	...	...	...	...	Appacutty
„ (Female)	...	...	...	...	...	Leong Sai

9. The staff has worked well. I should like to make special mention of the work done by Assistant Surgeon Mr. G. H. Oorloff and Dresser Sinnappu. It is largely due to the whole-hearted interest shown in their work combined with a sympathetic attitude to the patients that this treatment centre has proved a success.

DISTRICT HOSPITAL, KUALA LUMPUR, VENEREAL DISEASE TREATMENT CENTRE.

This consists of a clinic and two wards in the hospital devoted solely to treating venereal diseases. During the year under review, 1,281 patients of both sexes and all nationalities received treatment.

2. The following table shows nationalities and diseases:

Nationality.	Total.	Syphilis.	Per cent.	Gonorrhoea.	Per cent.	Soft sore.	Per cent.
Chinese	455	278	60.0	101	22.1	76	16.7
Tamils	652	225	34.5	221	33.8	206	31.6
Malays	74	41	55.0	26	35.1	7	9.4
Sikhs	31	17	54.0	7	22.5	7	22.5
Eurasians	20	7	35.0	12	60.0	1	5.0
Others	49	22	44.8	20	40.8	7	14.0
Total	1,281	590	46.0	387	30.2	304	23.0

3. It will be seen from this table that the Chinese are the heaviest sufferers from syphilis.

4. Out of the total number treated 46 were females and 1,235 males.

							Males.		Females.
Indoor	...	...	...	...	...	...	912	...	12
Outdoor	...	...	...	...	...	...	323	...	34

5. Record of work:

Urethral irrigations	...	...	...	...	...	...	...	5,889
Prostatic massage	...	...	...	...	...	...	...	337
Novarsenobillon injections	...	...	...	...	...	...	...	2,505
Stabilarsan injections	...	...	...	...	...	...	...	36
Sulfarsenol injections	...	...	...	...	...	...	...	268
Mercury injections	...	...	...	...	...	...	...	1,986
Bubo aspirations	...	...	...	...	...	...	...	163
Wassermann blood test	...	...	...	...	...	...	...	967
Microscopic examinations	...	...	...	...	...	...	...	1,255
Bismostab injections	...	...	...	...	...	...	...	200
Lumber puncture	...	...	...	...	...	...	...	4

The third graph shows admissions and diseases for second half of 1925, whole of 1924 and 1925.

BUBOES.

6. Two hundred and eleven cases were treated during the year. Of these 163 were treated by aspiration and 48 subsided under treatment with glycerine and ichthyol. Out of the 163 which were aspirated, 98 were treated by injections of tincture iodine 1 in 20, and 65 by injections of mercurochrome 2 per cent. soluble, the latter treatment proved more efficacious than the tincture iodine. Treating buboes by aspiration considerably reduces the stay in hospital as compared with treatment by incision.

BALANITIS GANGRENOSA.

7. Number of cases treated, two. Both made a rapid recovery under treatment with hydrogen peroxide and bismuth formic iodide dressing.

GRANULOMA INGUINALDE.

8. Thirteen cases received treatment during the year:

							Nos.		Nos. cured.
Tamils	...	...	...	...	...	...	9	...	2
Chinese	...	...	...	...	...	...	3	...	3
Sikhs	...	...	...	...	...	...	1	...	1

9. The following treatment was adopted:

- (1) Cleaning the affected part daily with normal saline, removing with great care the discharge;
- (2) Exposure to the sun for one hour;
- (3) Mercurochrome 2 per cent. soluble is applied and allowed to remain on the affected part for two hours;
- (4) Gauze dressing soaked in mercurochrome 2 per cent. soluble applied and allowed to remain until next morning.

10. Chinese respond more readily to treatment than Tamils.

11. Pharmosol manganese, potassium permanganate, novarsenobenzol and tartar emetic were also applied and proved of no value, the two latter being very painful.

12. Wassermann results: six positive; seven negative.

GONOCOCCAL ARTHRITIS.

Drug used.	Nationality.			Result of Treatment.					
	Chinese.	Tamils.	Malays.	Chinese.		Tamils.		Malays.	
				Cured.	Not cured.	Cured.	Not cured.	Cured.	Not cured.
Sulfarsenol ...	8	24	—	4	4	19	5	—	—
Gono: Vaccine ...	—	2	1	—	—	2	—	1	—
Pharmasol Mang ...	2	4	—	—	2	2	2	—	—
Sodium Iodide ...	—	2	—	—	—	—	2	—	—
Calcium chloride ...	1	1	—	—	1	—	1	—	—
Mercurochrome ...	2	—	—	—	2	—	—	—	—
	13	33	1	4	9	23	10	1	—

13. The above table shows number, nationality and drugs used, with results since beginning of May, 1925. It will be seen that Tamils account for the largest number treated, and also show a large percentage of cures as compared with Chinese. I consider this due to the absence of secondary foci of infection amongst Tamils such as carious teeth and pyorrhoea.

EXFOLIATIVE DERMATITIS.

14. Two cases.

No. 1.—MALE SINGHALESE.

First symptom occurred after the 5th injection of novarsenobillon, the patient had received a total of 2.25 grams. The following treatment was prescribed, viz.: four injections of intramine 2 c.c. at interval of four days, colossal sulphur 3i b.d., there was no improvement, he was then given sodium thiosulphate 2 drachms b.d., 0.3 grams intravenous for three days followed by seven injections of 0.45 grams on alternate days. This treatment proved efficacious.

No. 2.—MALE CHINESE.

In this case ametox (May and Baker) was administered, three intravenous injections of 0.45. Symptoms cleared up completely after the 3rd injection.

Both patients were placed on a diet much the same as for cases of typhoid fever, with unlimited amounts of bland fluid. For local application, dry treatment, consisting of boric zinc, pulv. amyllum and calamine lotion.

Oily applications are only applied where the skin has become fissured and painful.

EPIDIDYMITIS.

15. Number of cases treated 29.

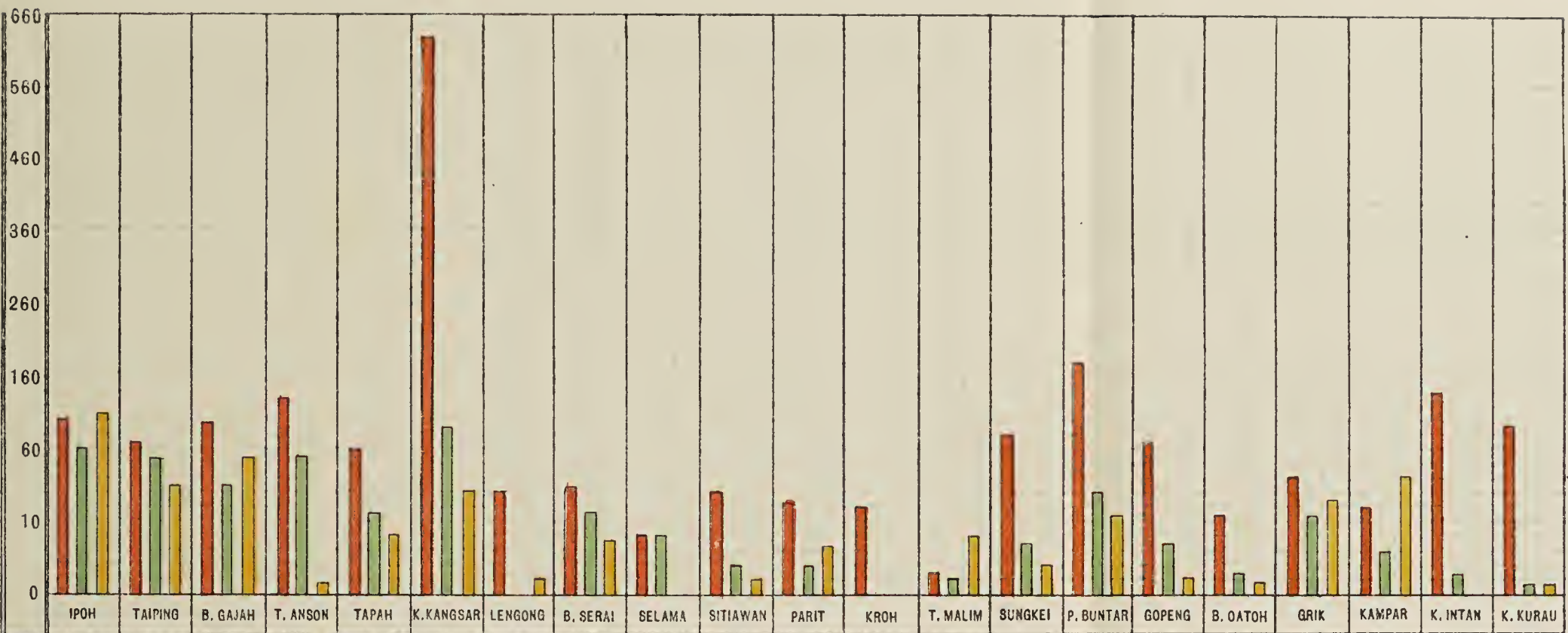
Satisfactory results have been obtained with sulfarsenol intramuscular injections.

First day	...	...	...	...	12	etgs.	...	Sulfarsenol
Second day	...	...	...	...	18	„	...	„
Third day	...	...	...	...	24	„	...	„
Fourth day	...	...	...	...	30	„	...	„

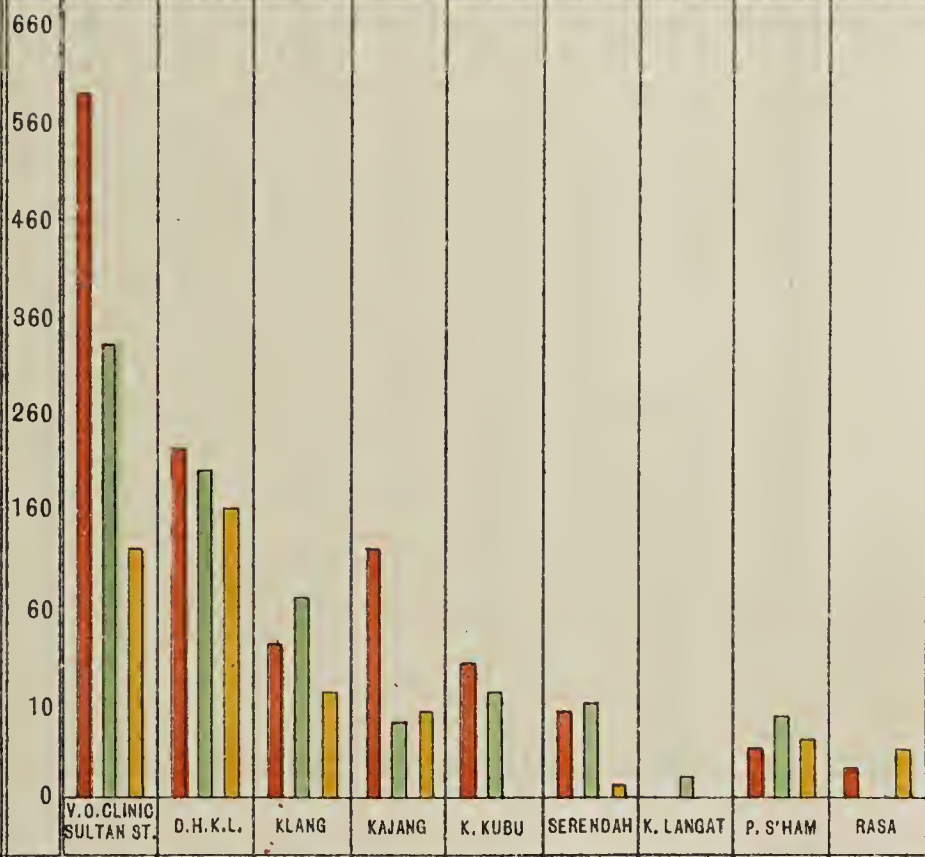
combined with local application of glycerine and ichthyol. The fourth graph shows the results of this treatment.

E. ARTHUR SMITH,
Specialist, Venereal Diseases, F.M.S.

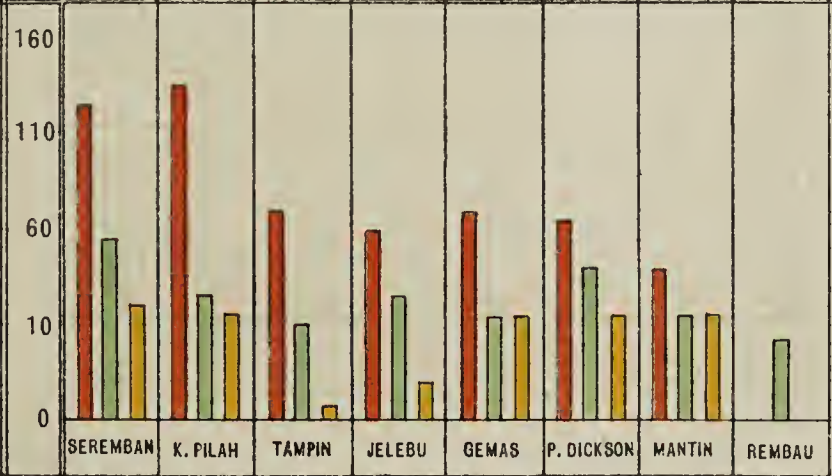
PERAK
SEPT.- DEC.



SELANGOR
SEPT.- DEC.



NEGRI
SEMBILAN
SEPT.- DEC.



PERAK

POPULATION 599,000		
DISEASE	AMOUNT	%
SYPHILIS	1847	·31
GONORRHOEA	405	·07
SOFT SORE	360	·06
TOTAL	2612	

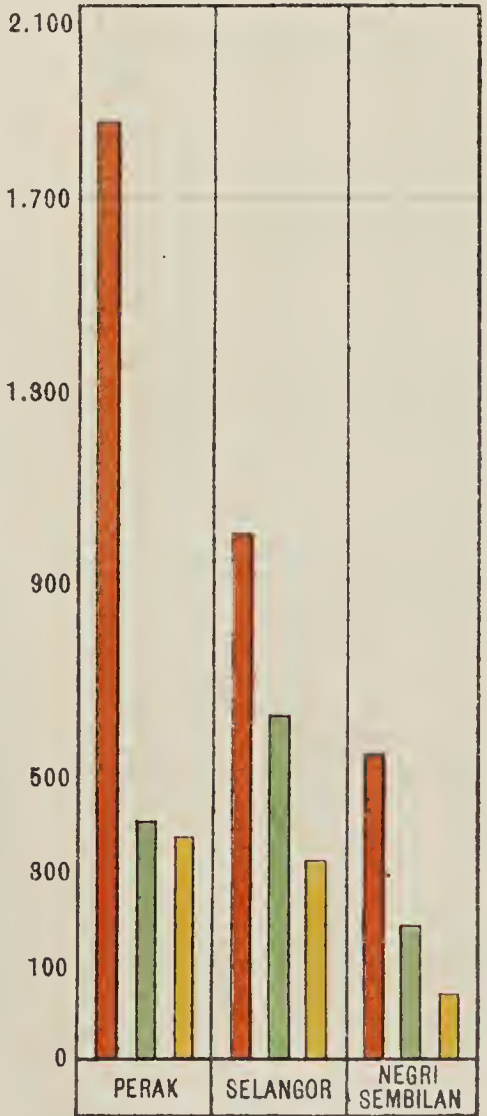
SELANGOR

POPULATION 401,000		
DISEASE	AMOUNT	%
SYPHILIS	992	·25
GONORRHOEA	629	·16
SOFT SORE	314	·08
TOTAL	1935	

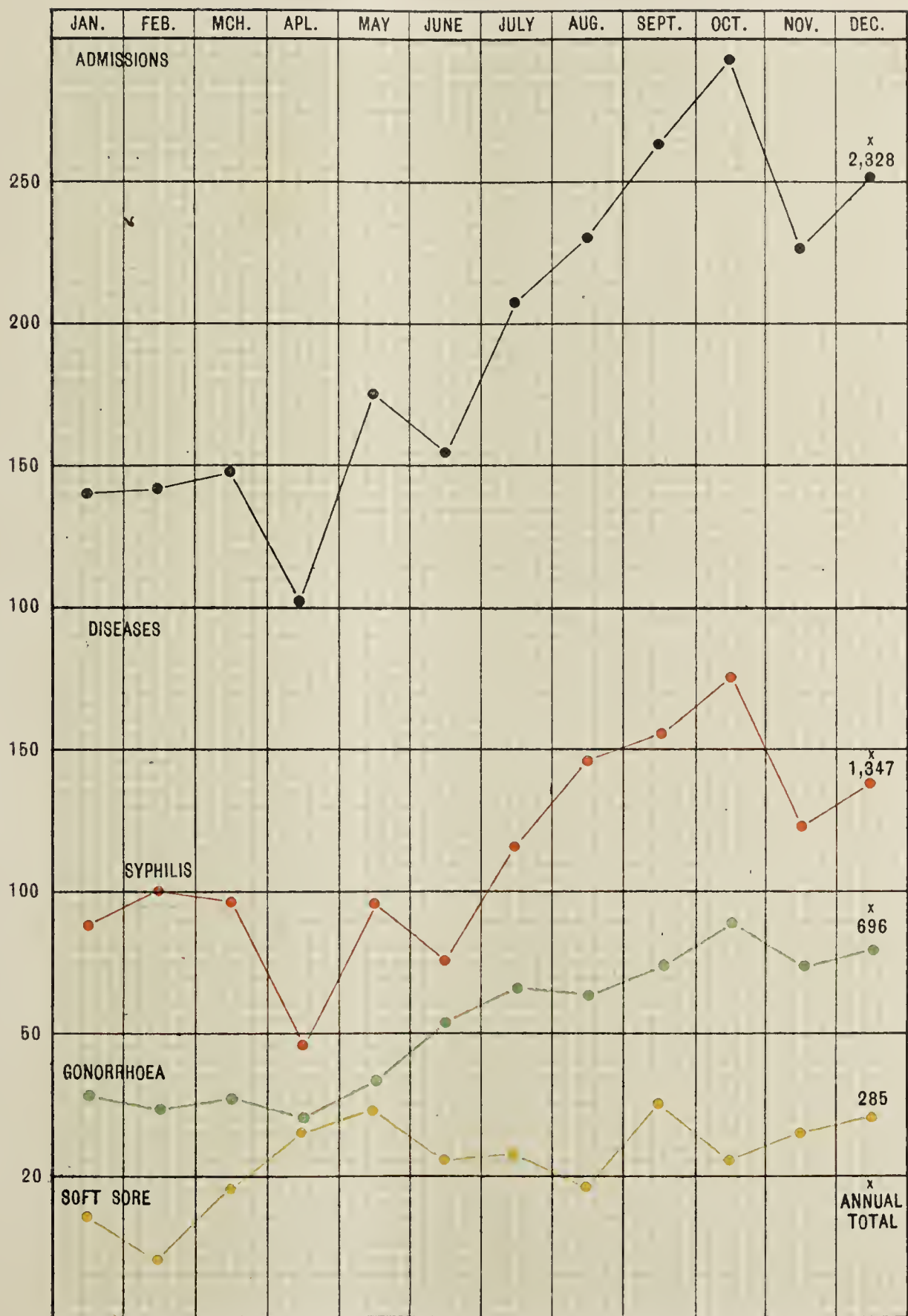
NEGRI SEMBILAN

POPULATION 178,762		
DISEASE	AMOUNT	%
SYPHILIS	538	·29
GONORRHOEA	185	·10
SOFT SORE	73	·04
TOTAL	796	

SYPHILIS
GONORRHOEA
SOFT SORE



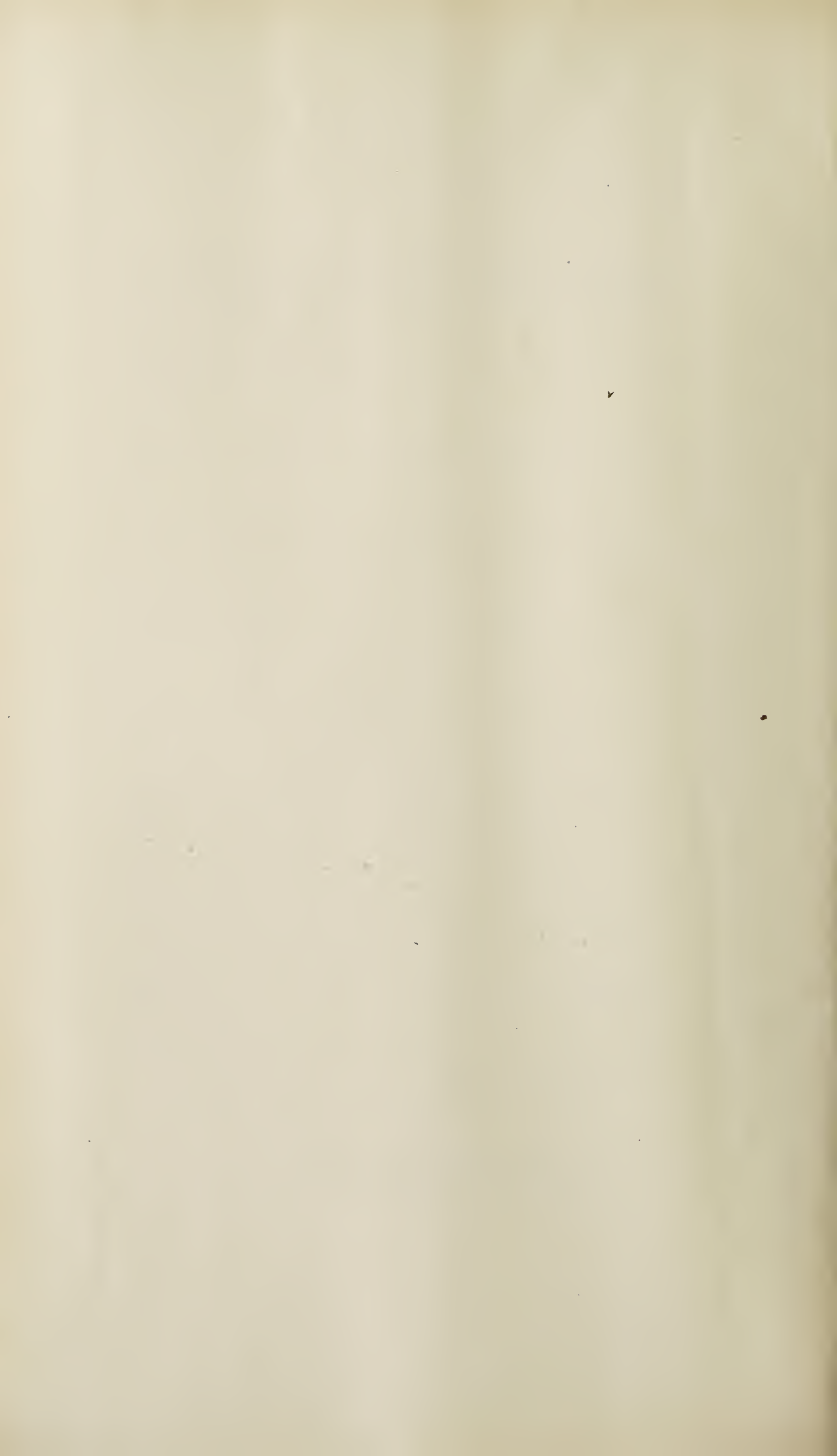
SHOWING INCIDENCE OF VENEREAL DISEASES DURING THE LAST QUARTER 1925.

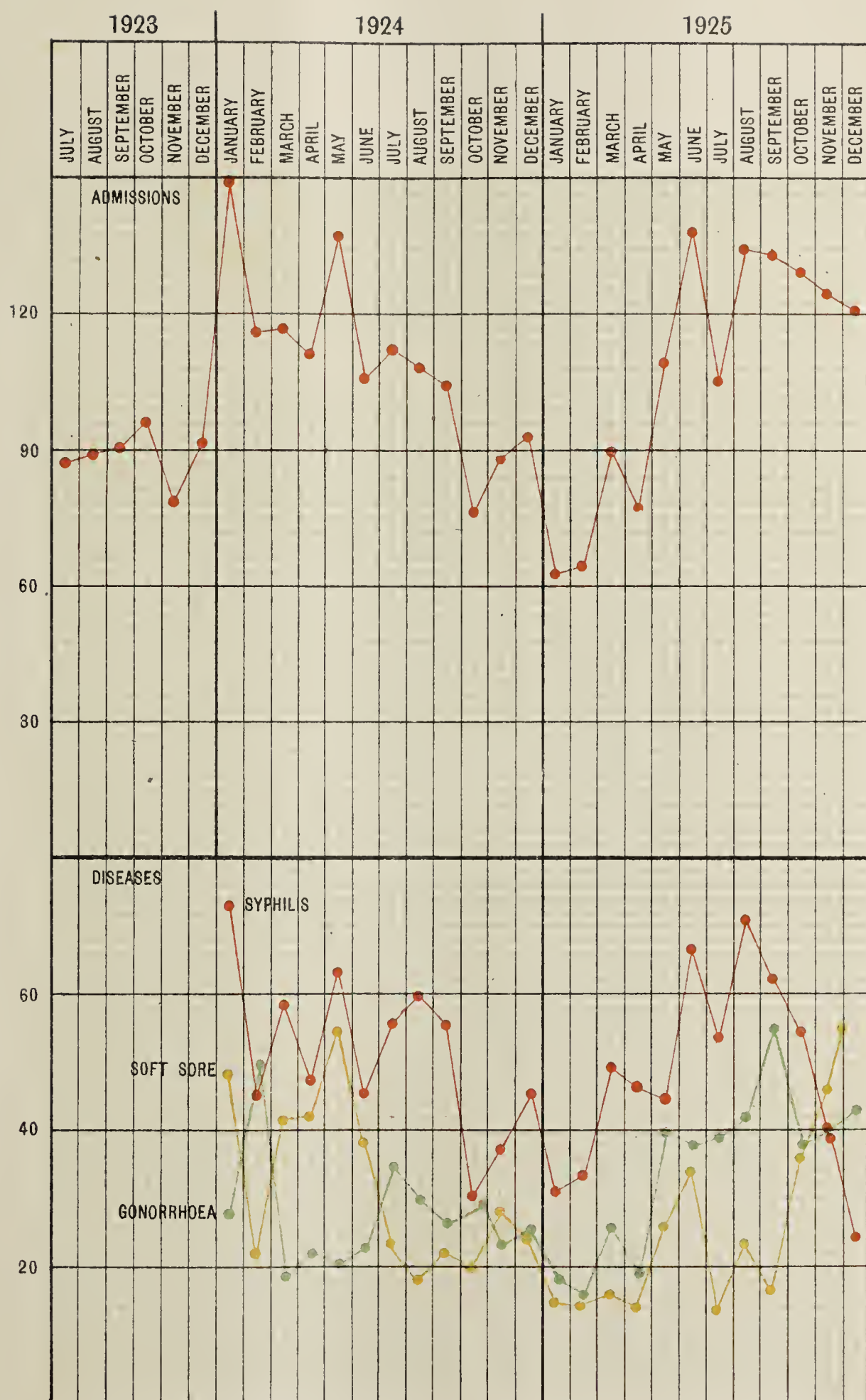


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GRAPH SHOWING ADMISSIONS AND DISEASES FOR 1925.

6. It will be seen from the above, during October the largest number of patients attended. A continual rise has taken place during the year except for the drop which occurred in April.

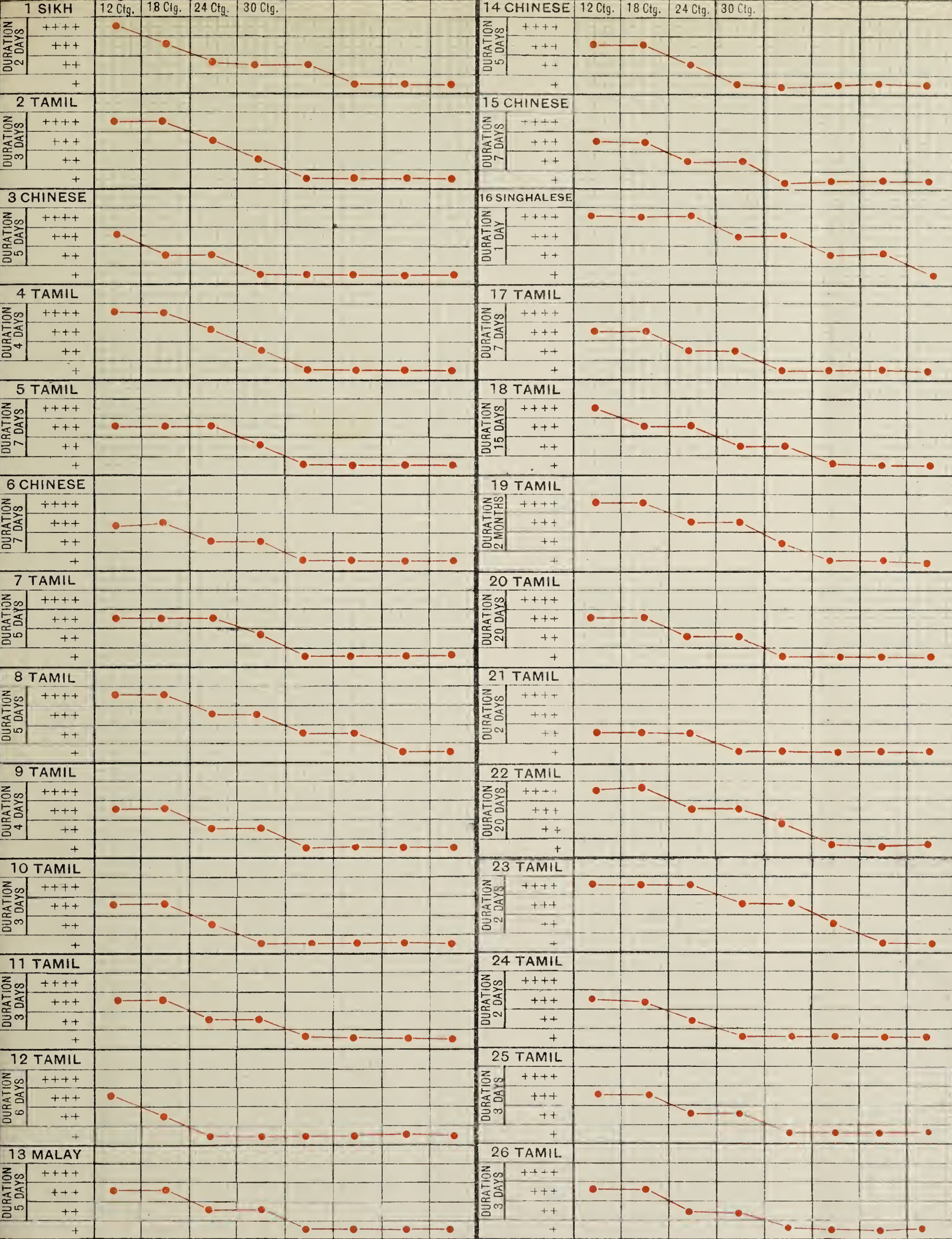




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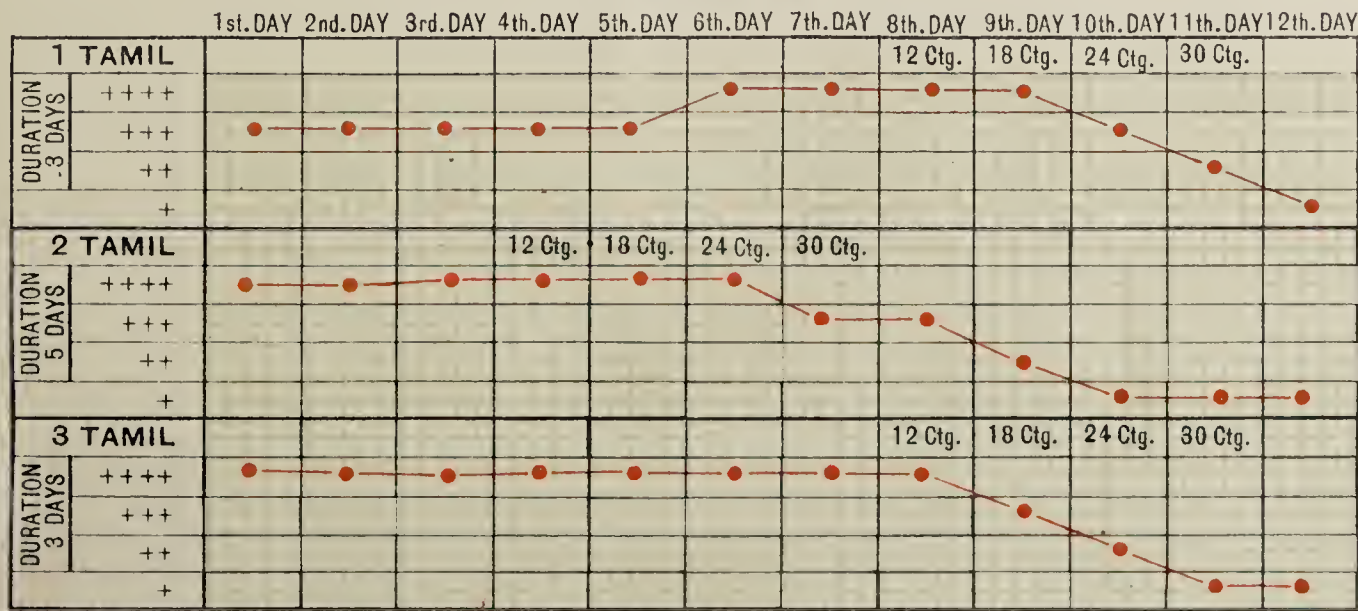
GRAPH SHOWING ADMISSIONS AND DISEASES FOR 2nd. HALF OF
1923, 1924 AND 1925.

1st. DAY 2nd. DAY 3rd. DAY 4th. DAY 5th. DAY 6th. DAY 7th. DAY 8th. DAY 1st. DAY 2nd. DAY 3rd. DAY 4th. DAY 5th. DAY 6th. DAY 7th. DAY 8th. DAY



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CONTROL



++++ = Very Acute
+++ = Acute
++ = Sub-Acute
+ = No pain swelling subsiding

CHART
SHOWING
26 CASES
TREATED
WITH SULF-
ARSENOL

REPORT OF THE RADIOLOGIST, FEDERATED MALAY STATES.

Delay in starting the new X-ray building, preventing the purchase of any new and modern equipment; and delay in providing the vitally necessary protection—resulting in one X-ray room being completely closed for the half year—are responsible for the greatly lowered efficiency of the Radiologist's Branch, with consequent reduction in the number of cases. For the same reasons, Perak and Negri Sembilan are still without X-ray equipment.

The above is my half yearly report of July, 1925, and applies equally well to the second half of the year.

However, the new building is now in course of erection and full equipment of the most modern type, specially designed by the Radiologist for the climate of Malaya, has been ordered or is being constructed locally.

Number of cases for 1925:

Radiology	...	...	...	...	...	...	...	...	885
Therapy	...	...	...	...	...	...	...	...	16

(Sd.) C. F. CONSTANT,
Radiologist, F.M.S.

REPORT OF THE MEDICAL OFFICER IN CHARGE OF THE
LEPER ASYLUM, KUALA LUMPUR.

I have the honour to report on the work carried out at the Leper Asylum, Kuala Lumpur, during the year ending December 31st, 1925.

2. The total number of lepers treated was 635 with 31 deaths, giving a death-rate of 4.88 per cent. Comparative figures are :

				No. of cases treated.	No. of deaths.	Death-rate.
1925	...	...	...	635	31	4.88
1924	...	...	...	524	37	7.06
1923	...	...	...	443	48	10.06

The figures given above are very striking.

Cases Remaining.—On the 31st December there were 533 lepers in the Asylum.

Discharges.—Fifteen cases were discharged in the early part of the year. Eight of these were repatriated to India and seven being negative on bacteriological examination were discharged.

Admissions.—Two hundred and ten cases were admitted, of which 172 were Chinese, 34 were Indians, one Javanese and three were Malays.

The greater number of lepers come to the Asylum voluntarily but many of the cases were discovered in the Admission Ward of the District Hospital where they had come for treatment of other diseases.

Absconding Cases.—Practically every case that absconded has returned to the Leper Asylum sooner or later.

They have either been brought back by the Police or else have returned for various reasons of their own, such as inability to find occupation.

Transferred Cases.—I have received 42 cases from Taiping Leper Asylum.

Three cases were sent from Kuala Lumpur to Pulau Jerejak and two to the Central Mental Hospital at Tanjong Rambutan.

Treatment.—The Tai Foong Chee treatment is being used as a basis, and no other method seems better from the point of view of convenience and ease of administration.

The results obtained by the use of the *fresh* kernel of the *hydnocarpus anthelmintica* are excellent. The fresh kernel seems to contain the most active properties of Chaulmoogra oil and the use of the fresh seeds has just been supported very convincingly in a recent paper by Hirst.

The disadvantage that the freshly ground nut has of producing an irritative gastritis in some patients, has now been overcome by mixing the ground kernel with bismuth carbonate in the proportion of 3 : 1, respectively.

This modification is quite effective and consequently the Tai Foong Chee treatment has increased in popularity among the lepers.

Previously there were many who objected to taking the treatment on account of the acute indigestion following.

Four hundred and ninety-one patients out of 533 are now taking the treatment regularly.

One year ago, 287 patients were taking the treatment.

In 1924 the ethyl esters of chaulmoogra oil were given by injections to 38 persons. The treatment was abandoned after some months.

Thinking that a combination of E.C.C.O. and Tai Foong Chee would be desirable from a therapeutic point of view, a number of cases were started, about three months ago on the combined treatment of Tai Foong Chee by mouth and E.C.C.O. by injection.

On account of the rapid improvement in some of the lepers especially those with the nodular type of the disease, this method of treatment has become very popular, and I am now giving about 100 cases weekly injections.

The results in a short time are most encouraging and every fresh case admitted commences a course of E.C.C.O. injections in addition to taking Tai Foong Chee.

Thirty patients attend weekly for painting for their superficial leprous nodules with trichloroacetic acid. Mercuriochrome 220 as a 2 per cent. solution has been found of great use in curing the superficial ulcerations that are no doubt of leprous origin and which are so common among the late nodular types. It is used as a local application.

Hexamine internally, combined with injections of adrenalin very considerably shortens the time of the leprous skin reactions which are so frequent and so distressing. Fortunately after the reaction is over, there is practically always improvement as regards the actual leprosy.

I have used gorli seed oil by injection in a series of cases. This contains chaulmoogric acid and is on trial. The oil is slightly less irritating than E.C.C.O. After three months' trial the results are somewhat inconclusive, and its results will be reported later, after use in a further series of cases.

STAFF.

Dr. Travers handed over charge of the Asylum to me on September 11th. The Asylum is visited by me generally twice daily.

Mr. Eu Khay Hoe, an Assistant Surgeon from the District Hospital, visits daily.

Mr. Bain, the Steward, is a most valuable member of the staff. He is quite unsparing of himself in his keenness and devotion to the welfare of the Asylum and its inmates. His work merits the greatest of praise.

Mr. Zee Yew, also a leper, has been officially appointed as School Teacher and he takes a class of 14 Chinese boys. Their progress is most satisfactory.

BUILDINGS.

Six temporary attap houses, each accommodating 14 lepers have been built by the lepers themselves at a cost of \$300 per house.

I estimate that we shall require at least ten more of these houses this year.

Suitable sites within the grounds have been chosen for these.

(Sd.) RICHARD GREEN,
Medical Officer, Leper Asylum.

